Mesa Creek Land Health Assessment
2003-2004

Uncompahgre Field Office - B.L.M.

Land Health Assessment
Mesa Creek Area, 2003-2004

SUMMARY

This land health assessment evaluated nearly XXX acres of public land. The evaluation resulted in a determination of the acreage meeting the Rangeland Health Standards, the acreage not meeting, and the nature and location of the problems on the landscape. A small amount of the landscape area was not evaluated due to inaccessibility, or because it was located on ecological sites which were not commonly occurring in the area. The following table shows the amount of land meeting or not meeting the Standards:

Acres Meeting Standards 1, 3,& 4	**Acres Not Meeting Standards 1,3,& 4**	**Acres Unknown 1,3,& 4**
Stream Miles Meeting Standards 2&5	**Stream Miles Not Meeting Standards 2&5**	**Stream Miles Unknown 2&5**

In order to make the above determination, the Mesa Creek Area was first rated according to each of the five Rangeland Health Standards separately. The following table better indicates the general nature of problems in the assessment area.

Standard	**Meeting**	**Meeting With Problem Areas**	**Not Meeting**	**Unknown**
Standard 1-Soils (acres)				
Standard 2-Riparian (miles)				
Standard 3-Healthy Communities (acres)				
Standard 4-T&E Species (acres)				
Standard 5-Water Quality (miles)				

Major Land Health Problems

Standard 1:
Standard 2:
Standard 3:
Standard 4:

Standard 5: Recommendations

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INTRODUCTION

Overview

The Mesa Creek Area is located in western Montrose County, on the western slope of the Uncompahgre Plateau, a distinctive uplift in western Colorado. The Mesa Creek Area extends south from the Mesa County line through the BLM lands near to the towns of Nucla and Naturita. It is bounded on the west by the San Miguel and Lower Dolores Rivers, and extends eastward to the Uncompahgre Forest Boundary (part of the larger GMUG Forest, see Figs 1.1 and 1.2). The unit encompasses about 148,400 acres, and is made up of parts of four Level 5 watersheds: Mesa Creek, Blue Creek, Tabeguache Creek, and the Coal/Cottonwood Creeks watersheds. The unit was identified in 1998, prior to the directive to base units on fifth order watershed boundaries. However, it is centered around the central part of the western slope of the Uncompahgre Plateau, and thereby forms a large and cohesive landscape "chunk".

The primary problems and issues we are aware of in the area include: noxious weeds and other exotic plants that are present and have the potential to increase; an imbalance in the age classes of pinyon-juniper woodland and sagebrush stands; road proliferation and the past land disturbances associated with uranium mining, grazing management, and mule deer habitat condition. Vegetation indicators used to assess these and other potential problems included: plant canopy cover, species composition, vigor, age class, diversity, exotic plants, noxious weeds, vertical structure, grazing impacts, fire evidence, and browse condition class. Indicators used to evaluate soil condition included: soil surface cover, as well as systematic observations of channel type, runoff drainages, pedestals, cryptobiotic crusts, plant distribution, litter retention, stream channel characteristics, riparian vegetation characteristics, channel characteristics, and water quality samples. Level 3 soil survey maps and remotely sensed vegetation maps (LANDSAT) were used to evaluate landscape patch distribution and arrangement. Wildlife and sensitive species evaluations were based on large-scale species distribution and trend data together with the vegetation and habitat condition and quality data when possible.

Land Status and Management

The Mesa Creek Land Health Assessment boundary encompasses a little more than 148,400 acres of which 112,908 acres are public land. These public lands are distributed across the area in large, almost continuous blocks of public land, except for the area around Nucla, and small private parcels along the rivers and streams (see Fig.1.2).

All public lands in the unit are covered by the San Juan/San Miguel Resource Management Plan (see Fig. 1.3). The area falls into ten different RMP management emphasis units, and contains a portion of the Tabeguache Area, a special management area designated by Congress and managed similarly to

wilderness. The majority of the area falls into the RMP's livestock emphasis unit. Major streams within these are identified for aquatic and riparian emphasis. Lands near to Uravan and Nucla are designated as minerals and coal lease units respectively. Very small areas of ponderosa pine that occur near the Forest boundary are to be managed with a forestry emphasis, while an area along the San Miguel River in the south of the Mesa Creek LHA area is a winter bald eagle concentration area, and a small recreation emphasis area is identified upstream of this. Areas near Uravan and along Tabeguache Creek have a cultural management emphasis. Scattered lands along the San Miguel River and near to Naturita are designated for general management, or future disposal for the isolated

Figure 1.1 Mesa Creek LHA general location map.

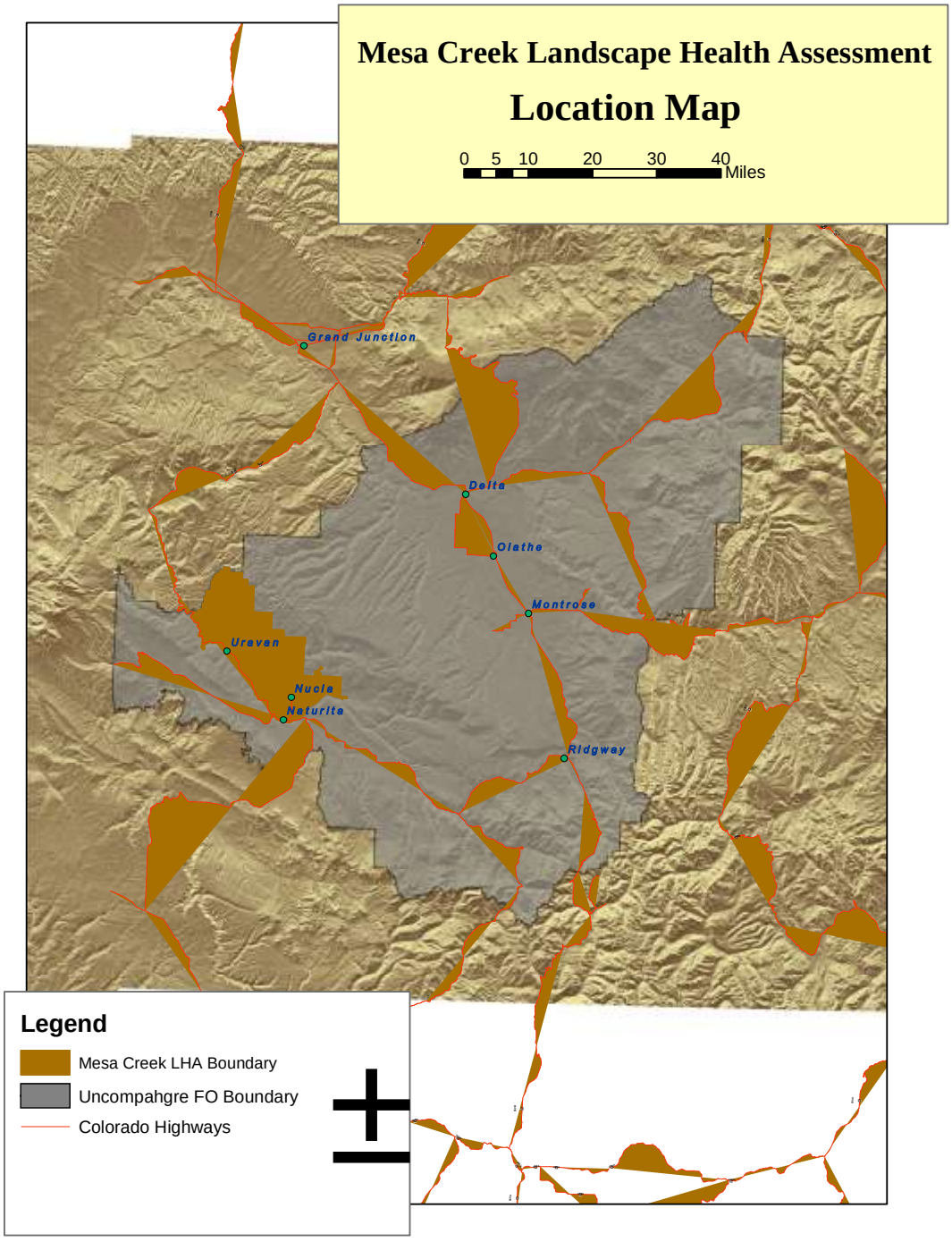


Figure 1.2. Mesa Creek LHA Area land ownership.

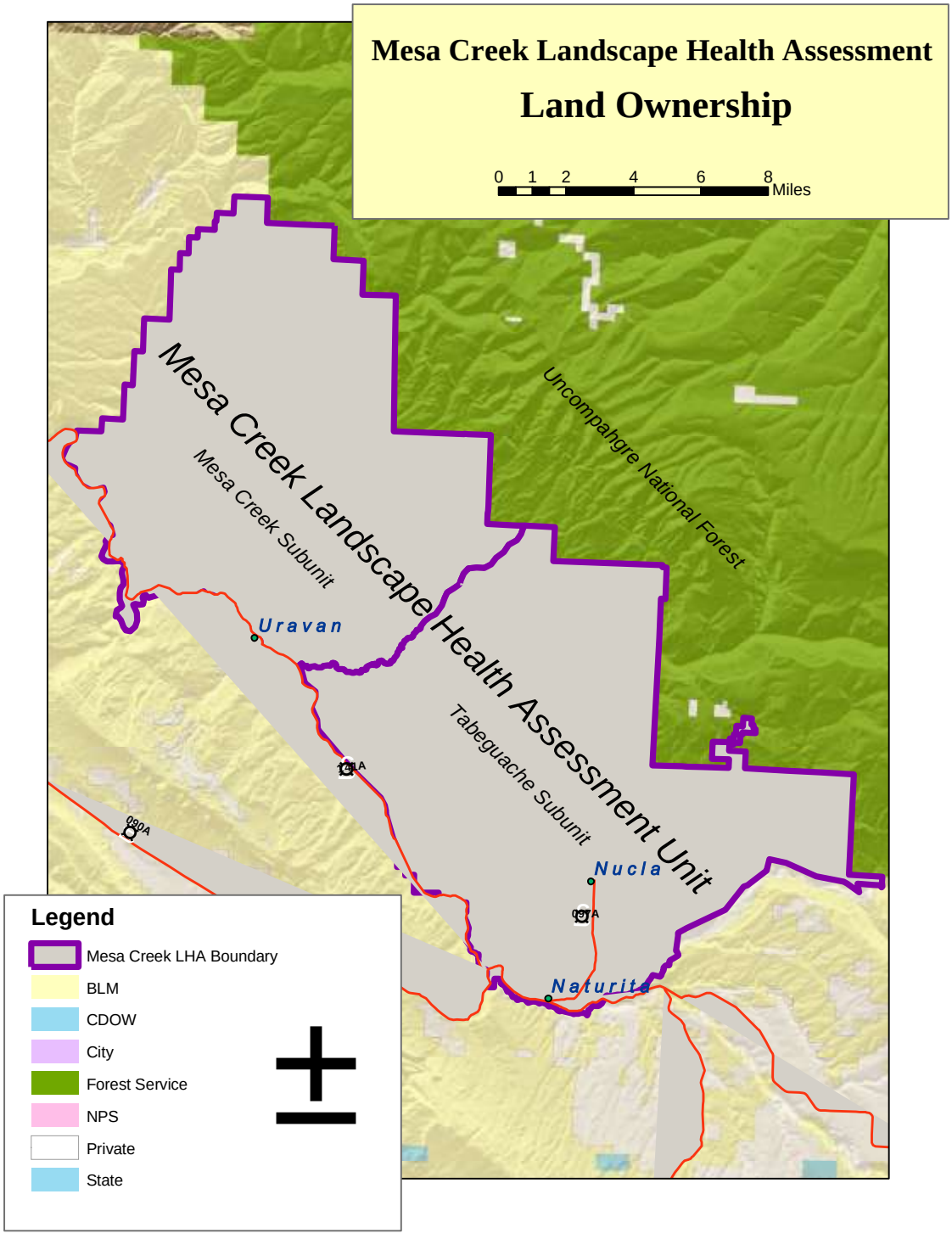
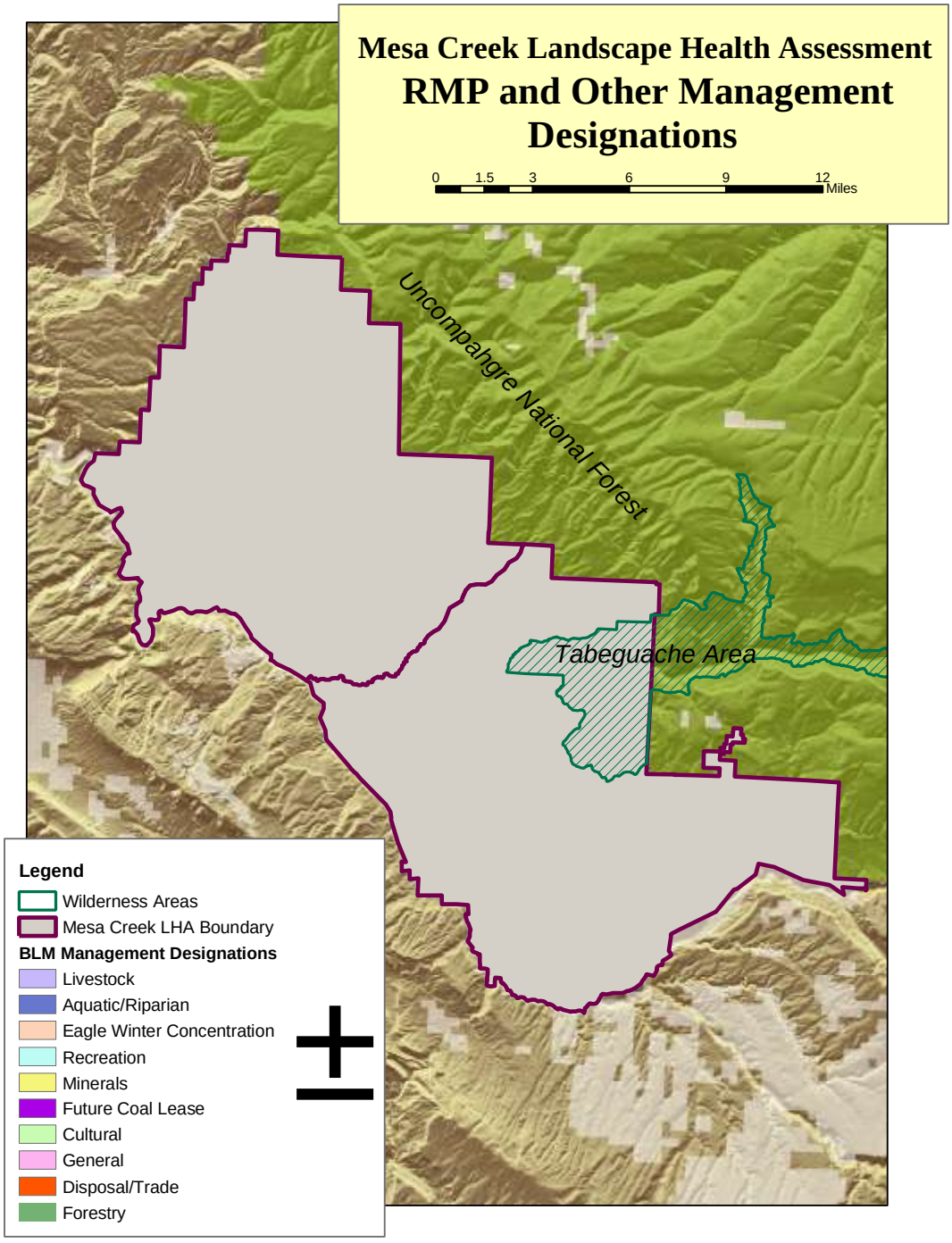

Mesa Creek Landscape Health Assessment
Land Ownership
0 1 2 4 6 8
Miles
Mesa Creek Landscape Health Assessment Unit
Mesa Creek Subunit
Tabeguache Subunit
Uncompahgre National Forest
Uravan
Nucla
Naturita
090A
097A
Legend
Mesa Creek LHA Boundary
BLM
CDOW
City
Forest Service
NPS
Private
State

Figure 1.3 Mesa Creek LHA area land management designations from the San Juan/San Miguel Resource Management Plan. Map also shows designated wilderness areas.



parcels.

There are thirteen grazing allotments in the unit that contain public land (See Figure 1.4). Nine of these are almost entirely made up of public land (Uncompahgre Bench, 25 Mesa South, High Mesa, Mesa Creek, Tabeguache, Dobie Canyon, Big Bucktail, Third Park, and Coal Canyon). The remaining four are 25% or less public land: Williams Ditch, Park, Second Park, and Tuttle Draw. All of the allotments are grazed by cattle. Uncompahgre Bench, Third Park, Williams Ditch and Tabeguache are grazed in fall and/or winter. Dobie Canyon, Big Bucktail, Tuttle Draw, Second Park and Coal Canyon are grazed in late winter or spring. 25 Mesa South is rotationally grazed in spring some years, and fall the others. Mesa Creek and the associated High Mesa are grazed either spring, fall or both. Park allotment is grazed during fall, winter or spring, depending on when the adjacent private land receives use. Some public land is unallotted for livestock grazing, and this is located in small, isolated parcels in the southern part of the unit.

The Mesa Creek and High Mesa allotments have been managed under the Mesa Creek Coordinated Resource Management Plan (CRMP) for the last 11 years. This plan was created to improve resource management by integrating livestock and wildlife management activities. Along with the BLM and the grazing permittees, the Forest Service, Colorado Division of Wildlife, and interested members of the public took part and were expected to be involved in the yearly management planning called for in the CRMP. The plan loosely follows Holistic Resource Management concepts, and generally allows greater flexibility for grazing management in addition to increased focus on mule deer and elk habitat management. Participants in the plan have expressed concern over the last five years that the CRMP is no longer functioning as it was intended.

Landform and Topography

Elevations range between 4,800 feet in the northwestern part of the unit along the Lower Dolores River to over 8,600 feet in the northeastern part (Figure 1.5). The Uncompahgre Plateau is the dominant landform in the unit (Figure 1.6). The unit lies across the middle portion of the western side of the Uncompahgre Plateau. It is bounded on the west by the San Miguel River Canyon. The Tabeguache drainage along with several other drainages to the north dissects the unit. A series of distinctive mesas rise above the San Miguel River on the west, and gently slope upward to the Uncompahgre Plateau on the east side of the unit.

Geology

The Mesa Creek LHA is located in the Colorado Plateau Geomorphic province. The area is typical of Colorado Plateau geology: gently dipping sedimentary rocks, altitudes exceeding 5,000 feet, the climate is semi-arid to arid, erosion has produced innumerable escarpments and structural benches and relief is the result of the incision of deep canyons below moderately flat terrain.

The formations that outcrop on the mesa tops are the Dakota or Burro Canyon sandstones, outcropping on the slopes is the Jurassic Morrison formation and the remaining formations outcrop along drainage channels. The geologic formations exposed in the area range in age from mesozoic to recent alluvial deposits. They are the Triassic Chinle formations, the Jurassic Wingate, Kayenta, Navajo, Entrada, Summerville, Carmel, and Morrison formations, the Cretaceous Dakota Sandstone and Burro Canyon formations as well as quaternary alluvium, colluvium and landslide deposits. The geologic formation not exposed in the area, but may be found at depth is precambrian rocks. Paleozoic rocks on the eastern half of the LHA were not deposited on the western flank of the Uncompahgre Plateau and therefore do not out crop or occur at depth in the eastern portion of the area.

The primary geologic structure that exists in the LHA is the Nucla syncline. The Nucla syncline plunges gently to the northwest. It parallels the San Miguel River and the axis of the syncline is approximately three miles east of the river in the vicinity of the LHA. The Uncompahgre Uplift is on the eastern boundary of the LHA. Occurrences of faults are minor with the exception of the eastern boundary where there are several linear northwest trending fault zones resulting from the Uncompahgre Uplift mountain building episode.

Figure 1.4. Mesa Creek LHA Area grazing allotment boundaries

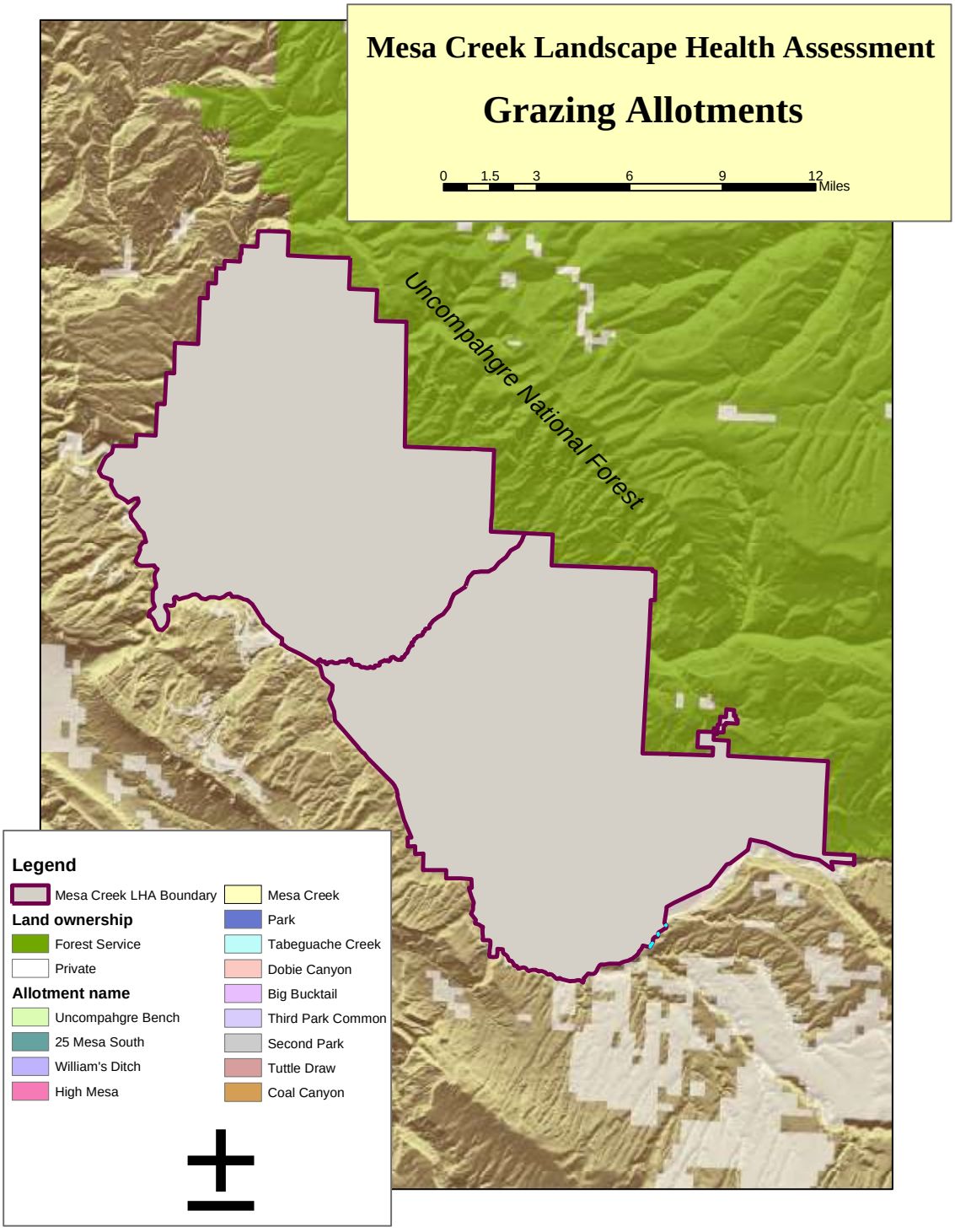


Figure 1.5 Mesa Creek LHA Area elevations, from Digital Elevation Model.

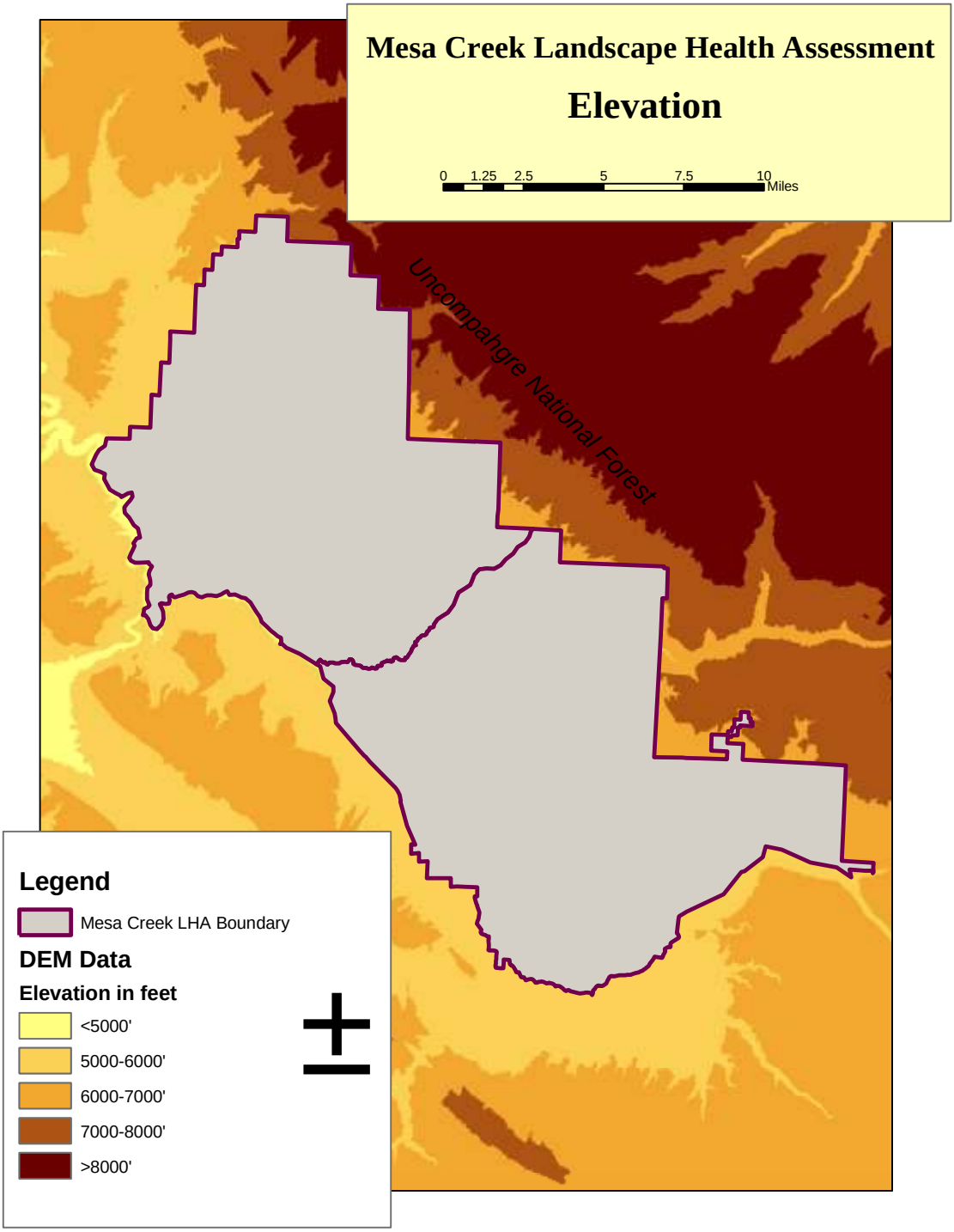


Figure 1.6 Mesa Creek LHA Area slopes and landforms. From Digital Elevation Model.

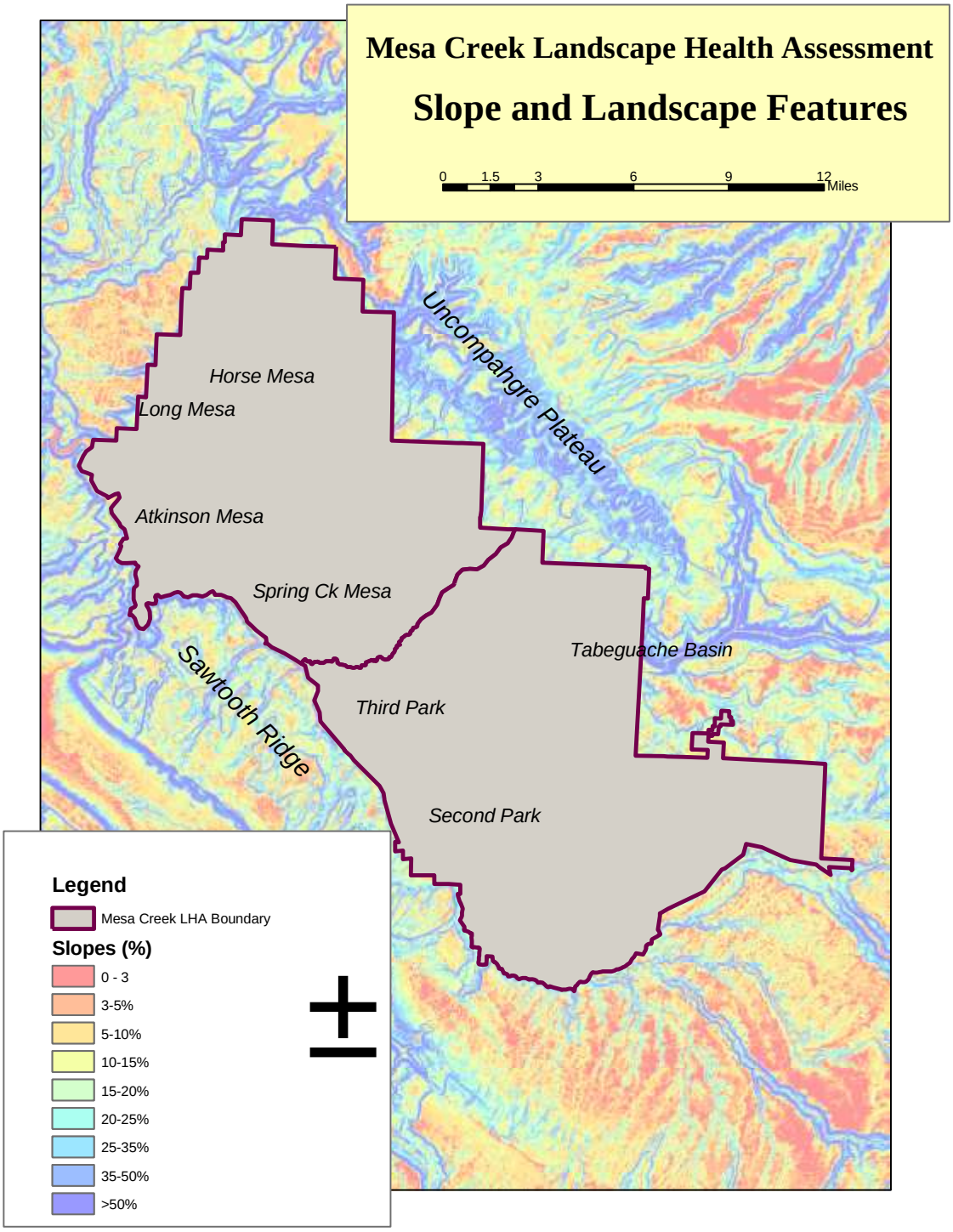
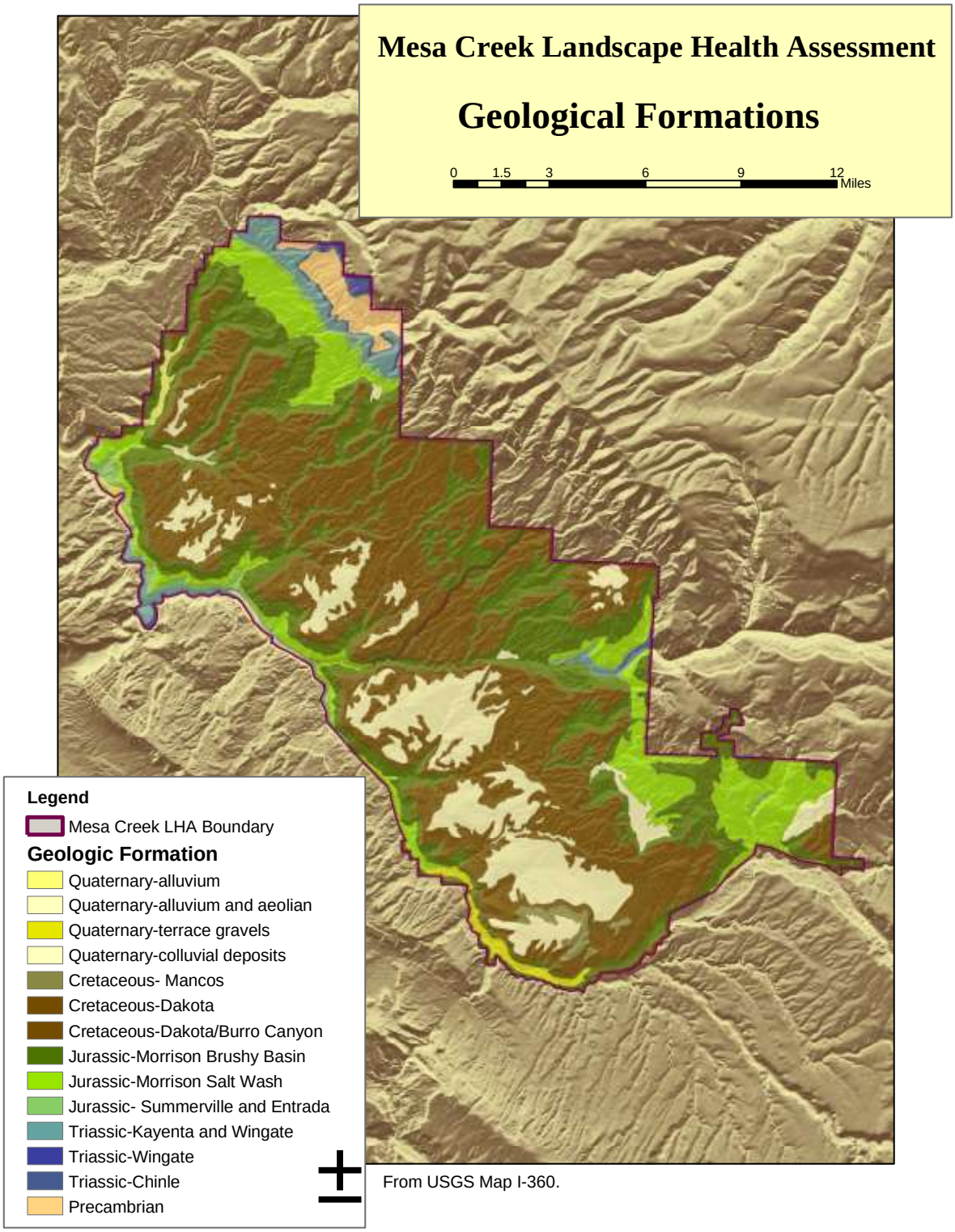


Figure 1.7 Geology of the Mesa Creek LHA area.



From USGS Map I-360.

Soils on public lands in the unit reflect the diverse geology of the area. Soils on all but 11,520 acres of the LHA unit are described in detail in the unpublished Order 3 San Miguel Soil Survey (SCS, 1988). The remaining acreage has not yet been surveyed. Within the surveyed area, forty different soil mapping units are found on public lands in the Mesa Creek LHA area. Of these, only twelve encompass 500 acres or more. These dominant soil map units are listed in Table 1.1 below. The majority of soils in the unit have relatively low potential for plant production.

Table 1.1 Important soil map units in the ~~North Delta~~ Mesa Creek Area and descriptions of their characteristics.

Soil Map Unit	**Name**	**BLM Acreage in Unit**	**Characteristics**
76	Pinon-Bowdish-Rock Outcrop Complex, 3-30% Slopes	48,813	On mesas, benches and escarpments, shallow, well drained loamy and gravelly soils intermixed with moderately deep well drained loamy soils, large areas of bedrock. Low available water capacity, high water erosion hazard
88	Rock Outcrop-Orthents, 40-90% Slopes	17,424	Extremely rough and eroded areas on side slopes, consisting of bedrock and cap rock intermixed with shallow to deep, well drained soils, typically stony loam, with moderate available water capacity, very high water erosion hazard
17	Barx-Progresso Complex, 3-12% Slopes	8,701	On old terraces and mesas, deep, well drained fine sandy loams mixed with moderately deep well drained loams. Moderate to high available water capacity, high water erosion hazard
23	Bodot, dry-Ustic Torriorthents Complex, 5-50% Slopes	7,921	On benches, terraces and landslides, moderately deep and well drained very bouldery clay loams intermixed with shallow to deep, well drained bouldery clay loams. Moderate available water capacity and high water erosion hazard
95	Skein-Rock Outcrop Complex, 3-65% Slopes	6,549	On canyon side slopes and mesa tops, shallow and well drained loams, intermixed with exposed bedrock. The loam has very low available water capacity and very high water erosion hazard
68	Nortez-Acree Loams, 1-12% Slopes	4,474	On benches and mesa side slopes, moderately deep and well drained loam intermixed with deep and well drained loam, low to high available water capacity and high water erosion hazard
87	Rock Outcrop	974	On steep canyon side slopes and breaks below mesas, barren exposures of sandstone

26	Borolls-Rock Outcrop Complex, 40-90% Slopes	881	On side slopes of canyons and mesas, shallow to deep and well drained stony loams and other textures, with moderate available water capacity and very high water erosion hazard, intermixed with rock outcrop
36	Clapper-Ustic Torriorthents Complex, 5-40% Slopes	709	On high terraces, breaks and mesas, deep and well drained loams and gravelly loams intermixed with shallow to deep well drained bouldery clay loams and other textures, with low to moderate available water capacity and high water erosion hazard
73	Paradox Fine Sandy Loam, 1-4% Slopes	707	On broad alluvial fans and alluvial valley floors, deep, well drained fine sandy loam with high available water capacity and slight water erosion hazard
81	Progresso Loam, 3-6% Slopes	613	On old terraces, benches and mesas, moderately deep, well drained loam with moderate available water capacity and moderate water erosion hazard
25	Bond-progresso Complex, 3-30% Slopes	510	On mesas and benches, shallow and well drained fine sandy loam with very low available water capacity and high water erosion hazard

Climate

The assessment area experiences a semi-arid climate, although precipitation varies in response to elevation. The elevation range of the assessment area is approximately 5,000 at the lower elevations along the Dolores River to about 7,500 feet on the higher mesas of the Uncompahgre Plateau. Annual precipitation averages 11-12 inches at the lower elevations, and 16 inches at the higher elevations. The three nearest locations where climate data is collected, are: Gateway (north of the assessment area, along the Dolores River), Uravan (on the San Miguel River in the lower elevations of the assessment area), and Norwood (10-12 miles south of the assessment area). The precipitation data from these three stations, in the tables below, clearly shows the clinal variation in precipitation in the vicinity of the assessment area. About one third of the annual precipitation is received during the winter months (November-March). June is the driest month of the year, while August receives the most precipitation. Large frontal systems typically provide the precipitation throughout the year, except in the mid and late summer months when the southwest monsoon can result in very localized, intense rainfall events.

Average annual temperature varies from about 53 degrees at the lower elevation to about 44 degrees at the higher elevation, a 3.6 degree decrease per 1000 foot increase in elevation.

Soil moisture in spring is generally consistent and moderately abundant, drying

out in late May and June, and then subject to localized short-term recharge from thunderstorm activity in late July through September. The storms bring with them lightening activity which generates some fire starts in dry years.

GATEWAY 1 SE, COLORADO (Elevation 4,550')
Period of Record Monthly Climate Summary

Period of Record : 8/ 1/1948 to 3/31/2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average Max. Temperature (F)	41.9	49.9	59.0	67.9	77.4	87.6	92.7	90.3	82.4
Average Min. Temperature (F)	17.7	24.4	31.5	38.1	46.6	55.0	61.7	59.6	51.0
Average Total Precipitation (in.)	0.75	0.68	1.00	1.03	0.99	0.53	1.04	1.32	1.03
Average Total SnowFall (in.)	5.7	1.7	2.4	0.8	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	1	0	0	0	0	0	0	0	0

Western Regional Climate Center

URAVAN, COLORADO (Elevation 5,020')

Period of Record Monthly Climate Summary

Period of Record : 11/17/1960 to 3/31/2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average Max. Temperature (F)	42.4	49.8	58.7	67.6	78.4	89.3	95.2	92.3	83.7
Average Min. Temperature (F)	15.3	22.3	29.1	35.5	44.3	52.2	59.2	58.1	48.3
Average Total Precipitation (in.)	0.88	0.75	1.01	1.01	0.99	0.47	1.22	1.37	1.40
Average Total SnowFall (in.)	4.0	0.7	0.4	0.2	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0

Western Regional Climate Center

NORWOOD, COLORADO (Elevation 7,020')

Period of Record Monthly Climate Summary

Period of Record : 8/ 1/1948 to 3/31/2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average Max. Temperature (F)	37.4	41.4	48.6	57.8	67.9	78.6	83.5	80.8	73.3
Average Min. Temperature (F)	10.3	14.9	22.1	28.2	36.0	43.7	49.9	48.7	41.7
Average Total Precipitation (in.)	0.95	0.82	1.07	1.08	1.15	0.80	1.86	1.94	1.69
Average Total SnowFall (in.)	13.0	10.3	9.9	5.2	0.6	0.0	0.0	0.0	0.1
Average Snow Depth (in.)	3	3	1	0	0	0	0	0	0

Vegetation

At least seventeen distinct native vegetation types occur in the landscape unit. These are tied to soil type as well as elevation and precipitation (Figure 1.8). Of the 17 communities, seven cover substantial acreage, or are otherwise notable within the LHA unit.

The drainages with intermittent or perennial water contain riparian vegetation. Riparian vegetation is most prevalent along the San Miguel and Lower Dolores Rivers, but also are present in lesser amounts along the tributaries. Rio Grande cottonwood trees (*Populus deltoides ssp. Wislizenii*), narrowleaf cottonwood (*Populus angustifolia*), and hybrids between these two occur in small stands. Sandbar willow (*Salix exigua*) and tamarisk (*Tamarix chinensis*) are the other main woody species near the water's edge. On higher terraces, skunkbush sumac (*Rhus aromatica*), New Mexico privet (*Forestiera* neomexicana), wood rose (*Rosa woodsii*), seep willow (*Baccharis salicina*) and clematis (*Clematis ligusticifolia*) are the most common species. Common reed grass (*Phragmites australis*) is present in some areas. Ephemeral drainages are often dominated by tamarisk and seep willow.

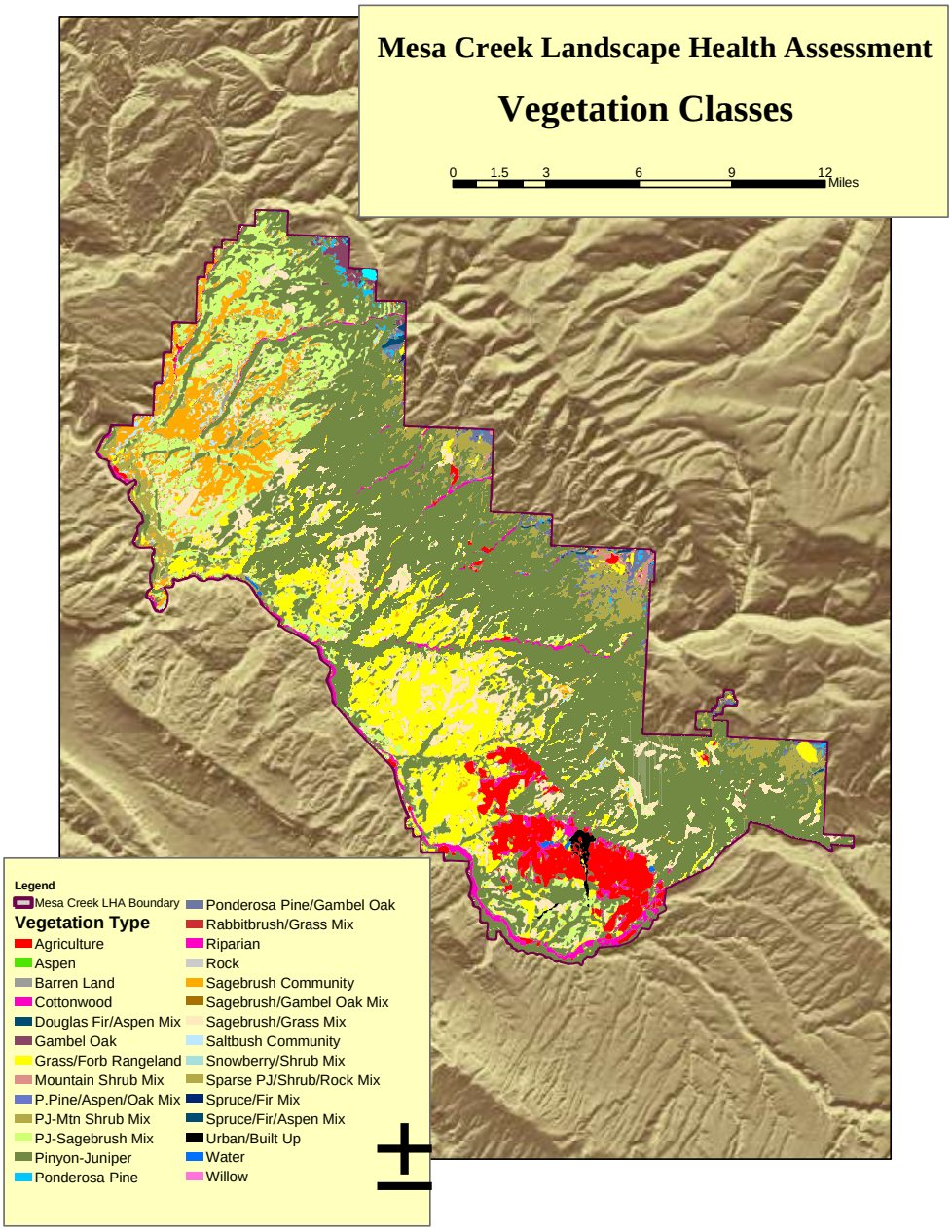
A grass/forb rangeland occurs on the lower elevation mesa tops, on moderately deep and deep soils. Typical species in this community include galleta grass (*Hilaria jamesii*), blue grama (*Bouteloua gracilis*), needleandthread grass (*Stipa comata*), sandberg bluegrass (*Poa secunda*), sand dropseed (*Sporobolus* cryptandra), Indian ricegrass, western wheatgrass (*Pascopyrum* smithii), and scarlet globemallow (*Sphaeralcia coccinia*). Four-wing saltbush (*Atriplex canescens*), prickly pear cactus (*Opuntia* spp.), and snakeweed (*Gutierrezia sarothrae*) are the most common shrubs. In areas that have received vegetation treatments, crested wheatgrass (*Agropyron cristatum*) is a common species. Degraded areas have cheatgrass (*Bromus tectorum*) and filaree (*Erodium cicutarium*) in varying amounts.

With increasing elevation, the grassland grades into pinyon-juniper woodland on shallower, steeper soils and big sagebrush on the deeper soils. The pinyon-juniper woodland is dominated by Colorado pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a sparse and variable understory that may contain green Mormon tea (*Ephedra viridis*), yucca (*Yucca harrimanii),* snakeweed, prickly pear cactus, muttongrass (*Poa fendleriana*), and bottlebrush squirreltail (*Elymus elemoides*). The sagebrush community appears to be dominated by various crosses between Basin big sage (*Artemesia tridentata tridentata*) and Wyoming big sagebrush (*Artemesia tridentata* wyomingensis). Frequently snakeweed, or four-wing saltbush is a secondary shrub in these communities, and there is an understory of the same native grasses found in the grass/forb community, and cheatgrass. At lower elevations, pinyon-juniper woodland occurs together with sagebrush on some sites. These may be areas that burned years ago and are slowly transitioning back to woodland dominance, or

areas where trees are “invading” deeper soils probably as a result of climate pattern shifts. At higher elevations, the pinyon-juniper community contains birchleaf mountain mahogany (*Cercocarpus* montanus), Utah serviceberry (*Amelanchior utahensis),* and Gambel oak. With increasing elevation, pinyon trees drop out of the community, and the mountain shrubs dominate the vegetation, with a productive understory of forbs and grasses such as elk sedge (*Carex geyeri*), Junegrass (*Koeleria macrantha*), Kentucky bluegrass (*Poa pratensis*) and lupine.

Small areas of ponderosa pine (*Pinus* ponderosa) woodland occur in the very highest parts of the LHA area. These often have an understory of Gambel oak, and sparse grasses and forbs.

Figure 1.8 Mesa Creek LHA Area vegetation derived from Landsat imagery.



Colorado Natural Heritage Program Potential Conservation Areas (PCA):

The Colorado Natural Heritage Program (Lyon and Sovell, 2000) has identified a number of sites within the analysis area that contain high quality plant communities, or assemblages of rare plants, and/or animals that they feel warrant protection and management. Each PCA was ranked for its biodiversity values, protection urgency, and management urgency. Figure 1.9 shows all seven PCA's displayed on a map of the assessment area. (There is some ambiguity in the PCA data from CNHP, in that the PCA's identified by Colorado Heritage Inventory for San Miguel and Western Montrose Counties, do not match those shown on the Statewide GIS file. Data shown here includes all the sites from both sources.) The following table shows the important resource values in each of the PCA's. The plant communities are considered to be high quality examples, which have few if any non-native plant species present. GIS data provided by CNHP did not show all the proposed PCA's that were contained in the Heritage Inventory completed by Lyon and Sovell in 2000. The map locations in Figure 1.9 show all of the proposed areas described in Table 1.2, but in some cases, a described area, may be included within a larger mapped area. For instance, Campbell Creek, is included within the area mapped as the San Miguel River at Tabeguache Creek.

Table 1.2 Potential Conservation Areas in the Mesa Creek area as identified by the Colorado Natural Heritage Program

PCA Name	Resource Values	Biodiversity Rank
Uravan West	New Mexico Privet foothills riparian community, San Rafael Milkvetch, Grand Junction Milkvetch, Lower Montane riparian shrubland community, and Brimstone clubtail (dragonfly)	B3
Hog Point	Payson's lupine, Narrowleaf cottonwood/skunkbrush community	B4
San Miguel River at Tabeguache Creek	New Mexico privet foothills riparian shrubland community, skunkbrush/coyote willow riparian shrubland community, Fremont's cottonwood riparian forest, Payson's lupine, Lower montane riparian shrubland community, narrowleaf cottonwood/skunkbrush community, Foothills riparian shrubland community, Great Plains salt meadows community, Mesic western slope pinyon-juniper woodlands, coyote willow/bare ground community	B1
Naturita Upland	Payson's lupine	B2
Spring Creek/Atkinson Mesa	Skunkbrush/coyote willow riparian shrubland, Narrowleaf cottonwood/skunkbrush community, Gray Vireo, and Sage Sparrow	B2

Big Bucktail Creek	Skunkbrush/coyote willow riparian shrubland community, Narrowleaf Cottonwood/skunkbrush community, Gray Vireo	B2
Campbell Creek	Narrowleaf Cottonwood/skunkbrush community	B3

[1] GIS data was not available for all of these sites,
Biodiversity rank: B1- Outstanding Significance, B2- Very High Significance, B3- High Significance, B4-Moderate Significance, B5- Significant

Figure 1.9: Mesa Creek LHA Area Potential Conservation Areas (CNHP)

At the present time, the San Juan/San Miguel RMP, as amended, does not place any of these PCA's into special management categories that directly benefit the specific resources of the PCA. All of these areas are open to off highway vehicle use, mineral material disposal, locatable mineral activity, location of rights-of-way, and all are subject to livestock grazing. This assessment did not set out to evaluate these sites, but there are some known problems on the sites.

Wildlife

The Mesa Creek Area (MCA) supports a large variety of upland, riparian, and aquatic wildlife species. Table 1.3 below shows a list of the most common or noted wildlife species, their occurrence, and the basic habitat types in which they are found. Some species are year-long residents, while others are migrants. A variety of small mammal, bird, and herptile species are scattered throughout the unit where their specific habitats are present. Habitat variety in this unit is great, and is created by diversity in topography, slope, aspect, vegetation, soils, and climate. The description of the existing vegetation in the Vegetation section of this report provides a good description of most wildlife habitats that occur in the management area.

Table 1.3. A list of the Mesa Creek Area's most common or noted terrestrial wildlife species, groups of species, their occurrence, and basic habitat types in which they are found.

Species (Common Name)	Habitat Type	Occurrence
Mule deer	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, Yearlong, mostly during winter
Elk	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, mostly during winter.
Desert Bighorn Sheep	Canyon benches, mesa tops, and valley bottoms	Uncommon, may be present along the Dolores River
Cougar	All types, mostly along rim-rock areas.	Common, yearlong
Bobcat	All types	Uncommon, yearlong
Coyote	All types	Common, yearlong
Cottontail rabbit	All types	Common, yearlong
Porcupine	Pinyon-juniper, riparian	Common, yearlong

Prairie dog (Gunnison)	Sagebrush, desert shrub	Common, yearlong
Raptor; Eagles, Hawks, Falcons.	All types	Common, yearlong
Blue grouse	Oak/Serviceberry	Common, yearlong
Gunnison sage grouse	Sagebrush; sagebrush/grass	Accidental if present
Chukar	Salt desert	Uncommon, yearlong
Neo-tropical birds	All types	Common, warm season
Small mammals	All types	Common, yearlong
Amphibians-Reptiles	All types	Common yearlong

Mule deer and elk are probably the most noted wildlife species that occur in the MCA due to their historic prominence in the ecosystem and their high social and economic values to the area and region. Both species use the area year-long, but primarily they use it as winter range, coming from higher elevation summer ranges on the Uncompahgre Plateau. The Colorado Division of Wildlife has classified all the area as winter range for both species; about ½ the area, that below 7,200' as sever winter range, and about ¼ the area as winter concentration areas (Figure deer/elk range). The severe winter range and winter concentration areas constitute BLM's crucial winter range. The intensity of use by each species varies widely from year to year, and is controlled primarily by population size, and the variation in timing and amount of snowfall. During most winters there is a high degree of overlap in mule deer and elk use on winter ranges, however, the extent of competition is unknown.

Winter habitat condition on much of the MCA, where the vegetation has not been recently treated to reset succession are in poor and declining conditions, specifically the browse stand condition and the arrangement of feeding and cover areas. Both the number of acres supporting browse, and the quantity of forage being produce are declining. Plant communities that provide winter browse plants are aging, resulting in fewer, older browse plants, and less annual forage production. The influence of maturing plant communities on productivity and diversity can be demonstrated by measuring the responses of a site before and after disturbance. BLM data collected on the Uncompahgre Plateau in 1988 to evaluate vegetative treatments shows a significant increase in browse stand condition, and vegetation composition and productivity after setting back succession (Table xx & xx).

TABLE 1. A comparison of Uncompahgre Plateau browse stand condition on untreated and treated BLM areas. Treatment ages ranged form 3 to 40 years. Data were collected in 1988. The weight estimate method was used.

Treatment Class	Average Number Species	Age Class - %					Hedging* % Moderate & Severe	Plants Per Acre
		Seedling	Young	Mature	Dead& Decadent	Crown Sprouts		
Untreated	2.7	1.9	5.1	67.2	25.1	0.7	51.4	2460
Treated	3.4	3.7	6.9	79.3	8.9	1.2	46.9	3048
Difference	+0.7	+1.8	+1.8	+12.1	-16.2	+0.5	-4.5	+588 (24%)

- Hedging is the form taken on by the browse plants due to foraging by animals over several years. It is judged in classes of light, moderate, and heavy.

TABLE 2. A comparison of annual herbaceous vegetation production (lbs/ac), and % vegetative class composition on untreated and treated BLM areas on the Uncompahgre Plateau. Treatment ages ranged form 3 to 40 years. Data were collected in 1988. The weight estimate method was used.

Treatment Class	Grass (%)	Forb (%)	Shrub (%)	Total
Untreated	84 (18.7%)	55 (12.2%)	310 (69.1%)	449 (100%)
Treated	262 (39.1%)	68 (10.1%)	340 (50.8%)	670 (100%)
Difference	+178 (212.0%)	+13 (24.0%)	+30 (10%)	+221 (+49%)

The Colorado Division of Wildlife manages big game on a herd, or population basis using Data Analysis Units (DAU), with sub-regions of Game Management Units (GMU) (Figure 1.DAUMap). The MCA is within DAU E-20(elk)/D-19(deer) and GMU 61, which is the west side of the Uncompahgre Plateau. Unit 62, the east side of the Uncompahgre Plateau is also in DAU E20/D19. Unit 61 is manages as a quality elk and deer hunting unit with limited licenses and greatly reduced hunting pressure for antlered deer and elk. In contrast Unit 62 is managed as an unlimited, over the counter license unit for bull elk, and a less restrictive limited draw for bucks. In recent years Unit 62 has been one of the most heavily hunted units in the state. E-20 ranks among the top DAU's in the state for elk harvest and hunting pressure. Because of the heavy hunting pressure in Unit 62 many of the elk from Unit 62 are driven into Unit 61, creating a high population level during the fall and winter.

Since 1980, the Uncompahgre Plateau mule deer population trend is down, and the elk population trend is up (Figure1.x). Deer numbers have declined 31% since the early 1980's, while elk numbers have more than doubled. Mule deer mortality was extremely high during the sever winter of 1983. The recent deer increase, and the elk decline probably reflection more restrictive hunting regulations for mule deer and more liberal hunting regulations for elk. The levels of mule deer and elk use on the MCA are believed to be at least proportional to that for the entire DAU.

The MCA provides some mule deer fawning habitat at the higher elevations in the oak/serviceberry vegetation, while only a relatively few elk calve in this area. Most elk calving occurs off the area to the north on the Uncompahgre Plateau.

The CDOW's current elk and mule deer population management targets on the Uncompahgre Plateau are 8,500 – 9,000, and 38,500 respectively.

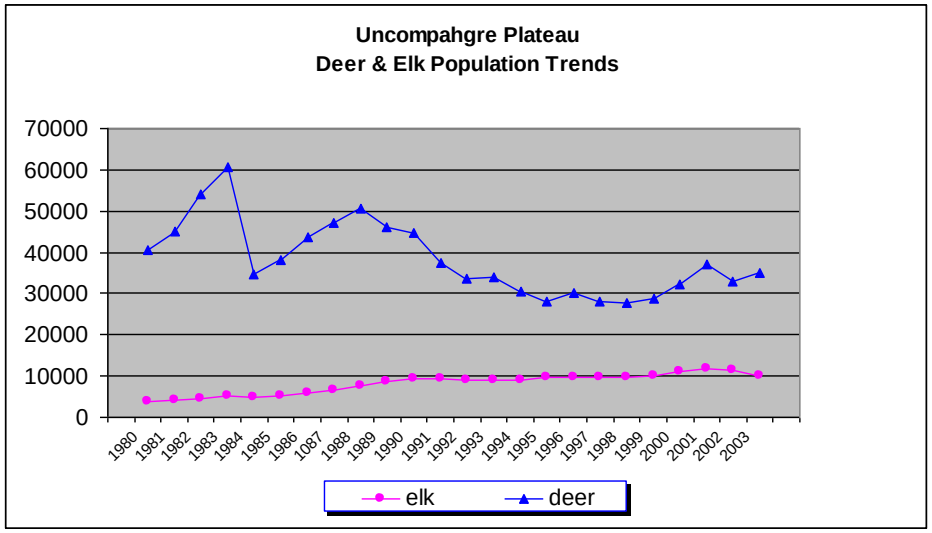


Figure 1.x. Mule deer and elk population trends 1980 – 2003.

At present there is no established desert bighorn sheep population within the MCA, but they are present in the Dolores River Canyon that borders the area on the southwest side. It is probable they are present in the area from time to time, but the bulk of the suitable habitat is within the Dolores River canyon proper.

Merriam turkey habitat within this MCA is limited mostly to the higher elevations along the east side of the

area, and along the major stream drainages. They use the larger canyon bottoms at lower elevations as winter range and the pinyon-juniper, oak/serviceberry areas at higher elevations for breeding, nesting, and brood rearing. Since the 1880's there has been a long history of great fluctuations in turkey numbers on the Uncompahgre Plateau. Turkeys were reported to be plentiful before settlement, but disappeared in the mid 1880's from several hard winters in a row, and disease contracted from domestic fowl. In the 1930's, turkeys were re-introduced, and did well until the mid 1960's, when again a significant decline occurred. Again the cause of decline was thought to be hard winters and diseases contracted from domestic fowl. In the 1980's the CDOW identified the disease that had, and was causing the mortality as "Micoplasma" a bacterial disease causing respiratory problems. "Micoplasma" comes from domestic fowl, and is passed from hens to their eggs, or it is passed through direct contact with other birds. In the late 1980's turkeys were again transplanted to the Uncompahgre Plateau, which have resulted in the current repetitively high population.

Large predators, such as coyotes, cougars, and black bears use the MCA area regularly as parts of their larger overall ranges. Of the predators, coyotes are the most numerous and widespread. Black bear primarily use the major drainages with well developed riparian vegetation, and the higher elevation oak/serviceberry areas, especially during spring and late summer, and fall for feeding. Black bear densities and total numbers on the Uncompahgre Plateau may be the highest in Colorado. Cougars probably use most all this area at some time or another while hunting, or raising young. The number of cougars present is probably very low, limited mostly to the ones who have established their territories, or parts of their territories in this area. There appears to be suitable denning habitat in the bluffly areas along the Dolores River and its major tributaries. While the exact status of these predator populations are unknown, they are all believed to be doing well.

Gunnison Prairie Dogs are found in the lower elevation areas of the MCA. Concentrations of animals have been large enough in the past to provide potential habitat for black-footed ferrets, especially in the areas near Nucla. Potentially they may occur anywhere there is open grassland, grass/sagebrush or salt desert shrub areas. BLM mapped some of the prairie dog colonies in the, but there has been no follow-up mapping. Plague caused fluctuations in the prairie dog populations have resulted in some of the previously mapped sites being abandoned. It also appears that there has been a general reduction in the total number of prairie dogs living in the area, but there is no quantified data to support this observation.

Aquatic wildlife species and their habitats are limited to perennial streams and their associated riparian vegetation (see Standard 2 for locations of perennial streams and more information on functional condition). The San Miguel and Dolores Rivers are warm water fisheries. Flows and fish habitat quality in the Dolores are governed largely by the management of McPhee reservoir upstream near Dolores, Colorado, and the use of irrigation water. Also, the San Miguel River's aquatic habitat quality is largely determined by irrigation water diversions and water use. Native fish species, Bluehead Sucker, speckled dace, sculpin, and Flannelmouth sucker, etc., are known to be present in the

San Miguel, Dolores and their major tributaries. Some frogs, including northern leopard frogs, toads, and water snakes are known to be present, but their status is unknown.

Riparian habitat is present along the perennial and intermittent streams listed in the above sections, and is extremely important for many of the wildlife species, especially small birds, mammals, reptiles, and raptors. However, the status of most of these species is unknown. Most public land riparian systems are in fair condition, but flow alterations for irrigation and other uses, along with the invasions of salt cedar, and Russian knapweed have degraded the usability of some areas for native wildlife, especially non-game birds. Most tributary streams are also incised, likely due to historic events, and many of them are still in the process of maturing; establishing a wider flood plain, and riparian system.

Tamarisk has established itself on most tributary streams, irrigation canals, BLM water impoundments, and other locations where runoff water may be temporarily detained. BLM has been cooperating with The Nature Conservancy on control of this woody species, as well as Russian olive and Siberian elm. TNC's objective for the San Miguel River watershed is complete elimination of Tamarisk, and progress is definitely being made toward that goal. The potential for elimination of tamarisk from the lower Dolores, and upper Dolores River watersheds is much lower, and currently little effort has been expended on those watersheds within the LHA area.

The limited amount of ponded open water within the analysis area limits its potential for waterfowl production. There are small numbers of waterfowl, including mergansers, Canada geese, mallards, green wing teal, etc. that nest along the San Miguel River and to a lesser extent on the Dolores River. The LHA area lies within the Pacific flyway.

Threatened , Endangered Species and Special Status Species:

Within the LHA area there are several species listed as threatened or endangered, as well as species that are candidates for listing under the Endangered Species Act, as amended. A list of those federally listed species evaluated is located in the Field Office' 6840 file. Based on the above list, the inventory data maintained by the Uncompahgre Field Office, and inventory data available from the Colorado Natural Heritage Program, the special status species shown in Table 1.4 below are found or potentially found within the analysis area. Additional species such as the Canada lynx and the boreal toad can be found within the area managed by the Field Office, but habitats for these species are not found within the analysis area.

Table 1.4 Potential Special Status Species in Mesa Creek Analysis Area

Threatened Endangered and Special Status Species			
Common Name	Scientific Name	Status[1]	Occurrence
Black-footed Ferret	*Mustela nigripes*	FE, SE	Not known to occur, but prairie dog host is present in the analysis area.
Bald Eagle	*Haliaeetus leucocephalus*	FT, ST	Winter foraging and some concentrations along the San Miguel and lower Dolores River.
Mexican Spotted Owl	*Strix occidentalis*	FT, ST	Potentially in the deep canyon areas, with
Colorado Pikeminnow	*Ptychocheilus lucius*	FE, ST	Occupied and critical habitat downstream of analysis area in Colorado R.
Razorback Sucker	*Xyrauchen taxanus*	FE, SE	Occupied and critical habitat downstream of analysis area in Colorado R.
Bonytail Chub	*Gila elegans*	FE, SE	Occupied and critical habitat downstream of analysis area in Colorado R.
Humpback Chub	*Gila cypha*	FE, ST	Occupied and critical habitat downstream of analysis area in Colorado R.
BLM Sensitive Species and Other Special Status Animals			
Common Name	Scientific Name	Status[1]	Occurrence
Yellow-billed Cuckoo	*Coccyzus Americanus*	FC, BLMS	Potential habitat along the lower Gunnison River, no individuals found in 1998 BLM survey of the river corridor.
Gunnison Sage Grouse	*Centrocercus minimus*	FC, BLMS	Not known to occur within this analysis area, but historic habitat is present.
River Otter	*Lutra canadensis*	SE	Occurs in the lower Dolores and San Miguel Rivers
Townsend's Big Eared Bat	*Corynorhinus townsendii*	BLMS	Potentially present

Spotted Bat	*Euderma maculatum*	BLMS	Potentially present
Big Free-tailed Bat	*Nyctinomops macrotis*	BLMS	Potentially present
Fringed Myotis	*Myotis thysanodes*	BLMS	Potentially present
Yuma Myotis	*Myotis yumanensis*	BLMS	Potentially present
Western Burrowing Owl	*Athene cunicularia*	ST	Dependent on prairie dog colonies, potential breeder in the area. BLM has not mapped prairie dog colony distribution within this LHA area.
Peregrine Falcon	*Falco peregrinus anatum*	SC	Known to breed in the Dolores River Canyon, but not known to nest within the LHA area.
Ferruginous Hawk	*Buteo regalis*	BLMS, SC	Present during migration, no nesting in the planning area.
Flannelmouth Sucker	*Catostomas latipinnis*	BLMS	The most most common fish in the lower San Miguel River. Also found in the Dolores R. and tributary streams.
Roundtail Chub	*Gila robusta*	BLMS, SC	Found in the Dolores R., lower San Miguel and tributary streams
Bluehead Sucker	*Catostomus discobolus*	BLMS	Found in the Dolores R., lower San Miguel and tributary streams
Midget Faded Rattlesnake	*Crotalus verities concolor*	BLMS	Present in PJ, rocky areas, greasewood/sage and sagebrush/rabbitbrush
Northern Leopard Frog	*Rana pipiens*	BLMS SC	Ponds and irrigation canals
Canyon Tree Frog	*Hyla arenicolor*	BLMS	Major canyon bottoms

BLM Sensitive Plant Species and Other Special Status Plants

Common Name	Scientific Name	Status[1]	Occurrence
Southern Maiden hair fern	Adiantum capillus-veneris	CNHP	Found in sandstone seeps within the Dolores R. Canyon., especially calcareous seeps
Naturita Milkvetch	*Astragalus naturitensis*	BLMS	In areas where sandstone bedrock is at the surface, with very thin soils, usually in PJ communities
San Rafael milkvetch	*Astragalus rafaelensis*	BLMS	steep slopes, canyon benches and talus slopes on sandy clay soil in PJ, sage and mahogany communities, not currently documented in the analysis area.
Grand Junction milkvetch	*Astragalus linifolius*	BLMS	Steep slopes, canyon benches, and talus slopes on sandy clay soil in PJ, sage communities. (Most likely a misidentification, in this area, this is probably San Rafael Milkvetch)
Sandstone Milkvetch	*Astragalus sesquiflorus*	BLMS	Sandstone rock ledges, fissures of domed slickrock, talus under cliffs, and sometimes in sandy washes.
Long flowered cats eye	*Cryptantha longiflora*	CNHP	Not known to occur within this LHA, but known from adjacent PJ communities

Giant Helleborine Orchid	*Epipactis gigantea*	CNHP	Riparian areas, wetlands and seeps
Paradox Valley Lupine	Lupinus crassus	BLMS	Loose shale slopes in Atkinson Creek, Coal Canyon, and near the Hopkins Field Montrose County Airport. Often associated with carbonaceous shale.
Paradox Breadroot	*Pediomelum aromaticum*	BLMS	Pinyon/Juniper and mixed desert shrub communities

1 Status is as follows: FE.= Federally Endangered; FT.= Federally Threatened; FEx. = Experimental Non-essential Population; FP.= Federal Proposed for listing; FC. = Federal Candidate for lising; SE. = Colorado Endangered; ST. = Colorado Threatened; BLMS = BLM Sensitive Species; CNHP = Species considered sensitive or rare by the Colorado Natural Heritage Program.

Sources:
A Natural Heritage Assessment, San Miguel and Western Montrose Counties, Colorado
Bald Eagle Inventories, BLM, 1980
BLM Rare Plant inventories, Various Years
Federal Register: December 28, 2000 (Volume 65, Number 250)
Colorado Natural Heritage Program, Spatial Data for the Uncompahgre Field Office
Colorado Division of Wildlife, Breeding Bird Atlas
CDOW Web Site

The field work for the assessment did not include a specific mission to identify new locations of rare plants or animals. If conflicts with rare plants and activities on public land had been noted, they would be documented here.

From early December through early April, wintering bald eagles forage throughout the LHA, and to some extent concentrate, and day roost on the lower San Miguel and Dolores Rivers. Helicopter and ground surveys, conducted by BLM in the early 1980's, did not locate communal roost sites within this LHA area on public land. At the national level, populations have recovered well enough since it was listed as Endangered in 1973, that in July of 1999 the USFWS proposed to remove the bald eagle from the threatened list (Federal Register, July 1999). There are no known nest sites on public land in the analysis area.

Black-footed ferrets have not been documented in the area. BLM has not mapped the distribution of prairie dogs within this LHA area. Survey work conducted by ENSR for the TransColorado gas transmission pipeline, in the vicinity of Norwood and Redvale, did not locate any black-footed ferrets. Subsequent work in the area indicated that plague had lowered the prairie dog populations to numbers that were insufficient to support black-footed ferrets. It is unlikely that there are black-footed ferrets in this area at this time.

Although the riparian corridor of the lower San Miguel and Dolores Rivers provides suitable habitat for yellow-billed cuckoo, the species is not known to nest here (Colorado Breeding Bird Atlas, 1998).

There is no indication that any individuals or population of Gunnison sage grouse are present in the LHA area. This species was probably present historically, and there may be potential for reintroduction in those areas with a substantial sagebrush habitat component.

The endangered Colorado pikeminnow is known to inhabit the lower 10 km of the Dolores River (Valdez, et.al. 1992), well outside this LHA area. The are no endangered fish present in the San Miguel River. Non-native fish are present in the Dolores and San Miguel, and may impact the ability of endangered fish to utilize this river system. Young Colorado pikeminnow have been found in the stomachs of channel catfish collected in the Dolores River, even though pikeminnow are very rare in the area.

(http://coloradoriverrecovery.fws.gov/Crwhynnf.htm) This situation is primarily under CDOW and USFWS jurisdiction. The BLM sensitive roundtail chubs, flannelmouth sucker, and bluehead sucker are known to be present in the San Miguel, Dolores, and some of the major tributaries. All of these BLM sensitive fish have been negatively impacted by upstream water management practices, incision of the stream channels, and the establishment of tamarisk, especially on the Dolores River. At this time the only management activity that is potentially impacting sensitive fish would be livestock grazing impacts on the lower portion of Mesa Creek, Campbell Creek, and West Atkinson Creek. Lesser problems exist on the South Fork of Mesa Creek, and Atkinson Creek.

There is little data on the condition of the river otter populations within the LHA area. Between 1988 and 1991, twenty-seven river otters were released into the upper Dolores River (River Otter Alliance web site, 2004). It is doubtful that any current BLM activities or management are having any effect on this species.

Burrowing owls may be found within the prairie dog colonies in this area. BLM has no records of this bird being sighted within this LHA, and there were no breeding individuals found during the work done for the Breeding Bird Atlas (1998). Populations of this species are believed to be declining throughout its range (CDOW, 2001). The species is vulnerable to human disturbance, avian and mammalian predation, and dogs.

Ferruginous hawks are known to occur in the area during migration, but there is no evidence that this species nests in the area or over-winter here. Midget faded rattlesnakes and northern leopard frogs are present, but no data is available on population health or trends.

The Paradox Valley lupine is found in several locations within the LHA area, with the largest number of individuals found in the Coal Canyon area and near the Nucla airport where the plants are associated with carbonaceous shale. During the summer of 2003 when the field work was being completed for this assessment, there was no evidence of this species in the Coal Canyon area. The extended drought most likely impacted this species and resulted in it's lack of growth. Generally there is no indication that livestock grazing has any impact on this species on public land.

The giant helleborine and long-flowered cat's eye are distributed over a fairly wide range within the State. The giant helleborine may have been more common in riparian areas prior to the introduction of livestock into the western ecosystems. This plant is rarely found in those locations today, but they are known to occur in the riparian zone of Spring Creek. No locations of the long flowered cat's eye are documented in the LHA area. Other rare plants include the sandstone milkvetch (Astragalus sesquiflorus), and southern maidenhair fern (Adiantum capillus-veneris),

Watersheds, Drainages, and Water Quality

The West Uncompahgre Landscape Unit is entirely with the Dolores River Basin but includes portions of two, 4th field Hydrologic Units, 14020004 (Lower Dolores) and 14030003 (San Miguel). Table 1 shows the Hydrologic Unit subdivision of the LHA area to the 5th field watershed level and the associated area included in this assessment.

Table 1 Watershed Subdivisions (Hydrologic Unit Codes) and Water Quality Classifications, and Standards for the Mesa Creek Landscape Unit.

5th Field Watershed	*Land Status Acres*		*Stream Segment*	*Stream Designation*	*Stream Classification*
	BLM	*Other*			
1403000442 Blue Creek	1,641	2,351	Dolores River		Aquatic Life Warm 1[1] Recreation 1a[2] Agriculture[3]
1403000345 Coal/Cottonwood Creeks	47,967	76,776	All tributaries to the San Miguel River within this 5th level watershed	Use Protected[5]	Aquatic Life Cold 2 Recreation 1a Water Supply[4] Agriculture
1403000443 Mesa Creek	34,554	35,667	Mesa Creek, from source to mouth		Aquatic Life Cold 1 Recreation 1a Water Supply Agriculture
1403000367 Tabequache Creek	29,775	33,204	Tabequache Creek, from source to mouth		Aquatic Life Cold 1 Recreation 1a Water Supply Agriculture

1 - Waters are designated either warm or cold based on water temperature regime. Class 1 water's are capable of sustaining a wide variety of cold or warm water biota, while class 2 waters are not.

2 - Recreation 1a waters that are suitable for recreational activities, when the ingestion of small quantities is likely to occur, and Recreation 2 are waters that are not suitable for recreational purposes.

3 - Waters that are suitable for irrigating crops usually grown in Colorado.

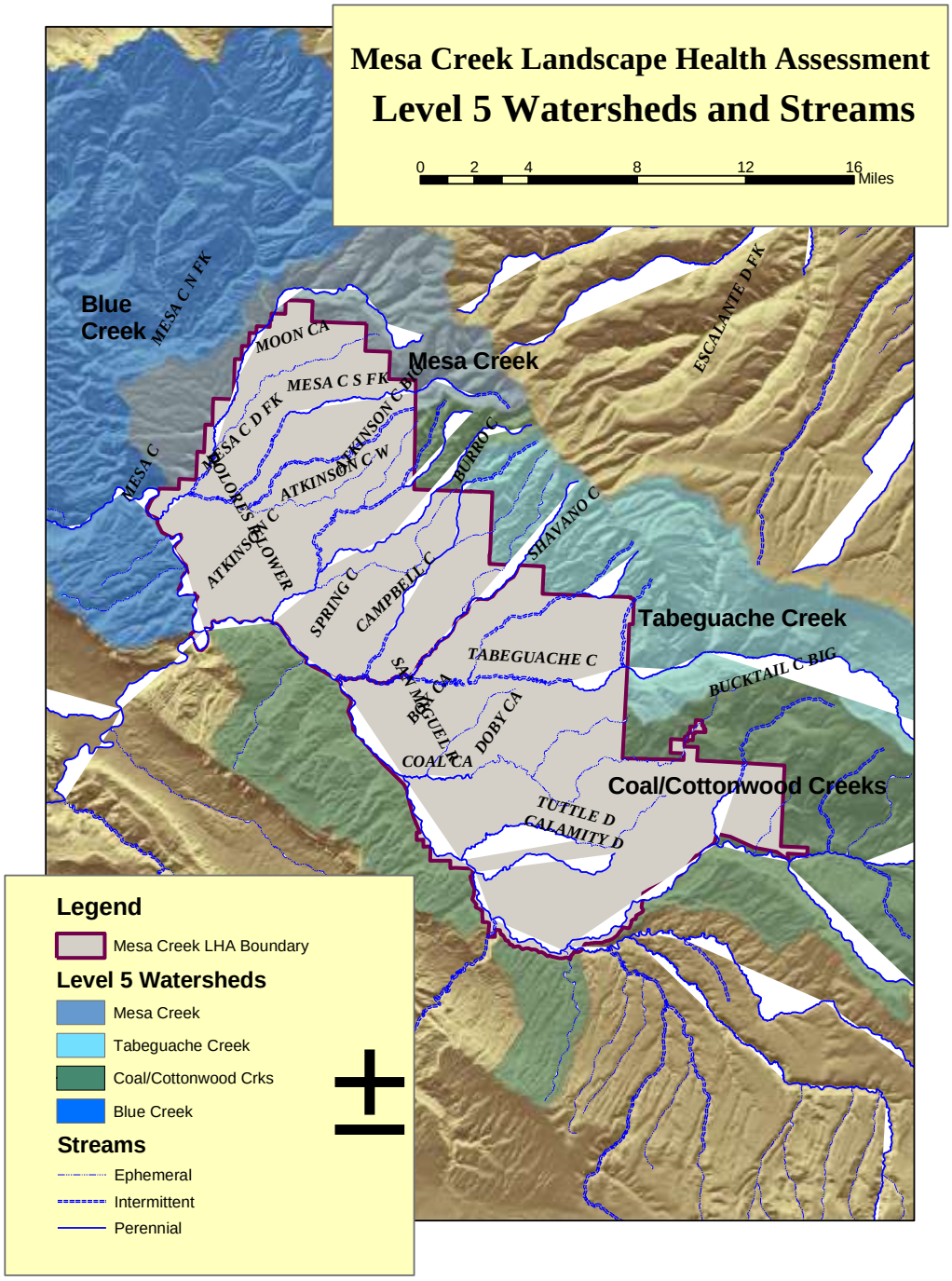
4 - Waters that are suitable or intended to become suitable for potable water supplies.

5 - The Colorado Water Quality Control Commission designates waters of the state, "Use Protected" if they do not warrant special protection provided by the outstanding waters designation or the antidegradation review process.

The major waterways in the assessment area include: Mesa, Atkinson, Spring, Tabequache, Coal, and Big Bucktail Creeks. The lower elevation portions of the area, border reaches of both the Dolores and San Miguel Rivers. The major drainages in the landscape unit experience high flows from both snowmelt and rainfall events. The snowmelt is typically generated from the high elevations of the Uncompahgre Plateau. Snowmelt from this area is generally earlier in the

season when compared to average snowmelt peak times, because of the steep slopes and southwesterly aspect of the Plateau. Short duration flood flows occur from high intensity precipitation events associated with Monsoonal air flow patterns in mid to late summer. Typically, these summer floods are localized and more significant on low order drainages in portions of the landscape unit where watershed cover is minimal.

Figure 1.13 Mesa Creek LHA area streams and 5th level watersheds.



Bacterial analyses (E. coli.) of flowing water bodies were collected in the spring of 2003 see Table 1. The State Recreation Classification of 1a, imposes an E.coli limit of 126 Colony Forming Units (CFU)/100 ml of sample. None of the streams sampled, irregardless of the uses occurring before or during sampling, exceeded the state limit for E.coli. To make a conclusive determination on these streams' compliance with the state standards for bacteria would require a more intensive sampling regime, because of the temporal variability of bacterial concentrations in natural water bodies. However, with all samples having much lower concentrations of E.coli than the standard, under a variety of flow and use conditions, should serve as a reliable indicator that these streams are in compliance with the state standards.

Table1. Bacterial Concentrations of the LHA Area Surface Waters

Date	*Water Source*	*Uses Present*	*E. Coli CFU/100 ml*	*Temp. C*	*State Stnd. CFU/100 ml*
5/8/2003	Mesa Creek	Heavy Grazing, recent high flows	3	13	126
5/8/2003	South Fork Mesa Creek	Light Grazing, recent high flows	5	10	126
5/8/2003	North Fork Mesa Creek	Light Grazing, recent high flows	2	8	126
5/13/2003	San Miguel Rv. Above Tabequache Cr.	Light Grazing, recent high flows	22	13	126
5/13/2003	Tabequache Cr. Near mouth	No recent use	2	NA	126
5/13/2003	Atkinson Creek	Recent livestock use, low flow	8	NA	126

Tables 2 a-b through 5 a-b, show chemical water quality characteristics of the landscape areas surface waters (Tabeqauche, North fork Mesa, South Fork Mesa, and Atkinson Creeks). The first table in each set represents low flow chemistry and the second table, high flow chemistry. The water quality is relatively similar throughout the area, being dominated by Calcium-Bicarbonate. Most constituents are in lower concentrations during the high flow season because of the dilution effect of snowmelt water. Nitrate and phosphate concentrations being largely responsible for eutrophication of aquatic environments, is in relatively lower concentrations in all streams sampled within the landscape area. Data from USGS Open File report 97-233 showed average nitrate and phosphate concentrations average 0.81 mg/l (2,076 samples) and 0.09 mg/l (287 samples), respectively, in the Upper Colorado Basin. None of the landscape areas streams, sampled for water chemistry, exceed these average values.

The last column in each table is the chemical results from a sampling effort during 2003. When comparing these values with the average baseline sampling results from the early 1980's, little change has occurred. A slight increase in some chemical ions in the more recent sample occurs because of the low flow conditions in 2003, a record setting drought, water year.

Table 2a. Low Flow Water Quality - Tabequache Creek.

Parameter	*Units*	*1979-84 Minimum*	*1979-84 Maximum*	*1979-84 Mean*	*7/21/2003*
Dissolved Solids	ppm	352	356	354	440
Conductance	Umhos/cm	439	648	544	601
Nitrate	mg/l	0	0.065	0.033	0.33
Selenium	mg/l	0.002	0.005	0.004	0.007
Bicarbonate	mg/l	227	255	241	300

Carbonate	mg/l	0	0	0	0
Sodium	mg/l	17	37	29	33.5
Calcium	mg/l	45.3	58	50.8	53
Magnesium	mg/l	17	26.75	22.24	27
Potassium	mg/l	4.5	9.4	6.6	9
Chloride	mg/l	11	27.2	18.9	26
Sulfate	mg/l	27.25	63	40.7	51
Ammonia	mg/l	0.32	0.7	0.51	0.00
Phosphate	mg/l	0	0.09	0.05	0.03
Turbidity	NTU	31	60	46	4.3
pH	SU	7.75	8.3	8.05	8.2
Flow	CFS	0.15	13	4.01	0.115
Temperature	Celsius	18	25	22	26

Table 2b. High Flow Water Quality - Tabequache Creek

Parameter	***Units***	***1979-84 Minimum***	***1979-84 Maximum***	***1979-84 Mean***	***7/21/2003***
Dissolved Solids	ppm	122	156	139	129
Conductance	umhos/cm	135	195	168	190
Nitrate	mg/l	0.07	0.08	0.08	0.70
Selenium	mg/l	0	0.025	0.013	0.002
Bicarbonate	mg/l	57	98	77	93
Carbonate	mg/l	0	0	0	0
Sodium	mg/l	0.89	4.9	3.1	5
Calcium	mg/l	20	30.4	24.1	23
Magnesium	mg/l	3.34	6	4.8	7
Potassium	mg/l	1.8	3.43	2.57	1.8
Chloride	mg/l	2.1	5	3.4	6
Sulfate	mg/l	7	25	16	11
Ammonia	mg/l	0.02	0.09	0.06	0.13
Phosphate	mg/l	0.02	0.04	0.03	0.01
Turbidity	NTU	98	250	174	NA
pH	SU	7.9	8.2	8	7.55
Flow	CFS	195	605	398	52
Temperature	Celsius	8	11	9.5	18

Table 3a. Low Flow Water Quality – North Fork Mesa Creek.

Parameter	***Units***	***1979-84 Minimum***	***1979-84 Maximum***	***1979-84 Mean***	***7/16/2003***
Dissolved Solids	ppm	310	517	414	Dry
Conductance	umhos/cm	404	730	488	Dry
Nitrate	mg/l	0	0.025	0.013	Dry
Selenium	mg/l	0	0.022	0.011	Dry
Bicarbonate	mg/l	202	279	241	Dry
Carbonate	mg/l	0	0	0	Dry
Sodium	mg/l	13	59.7	27.9	Dry
Calcium	mg/l	40	62.7	48.4	Dry
Magnesium	mg/l	13	29.96	17.99	Dry
Potassium	mg/l	1.9	3.37	2.60	Dry
Chloride	mg/l	12	28	21	Dry
Sulfate	mg/l	18	116	42	Dry
Ammonia	mg/l	0.24	0.24	0.24	Dry
Phosphate	mg/l	0.017	0.05	0.03	Dry
Turbidity	NTU	2	7.5	4.8	Dry
pH	SU	7.72	8.4	8.1	Dry
Flow	CFS	0.16	4.4	1.4	Dry
Temperature	Celsius	13	28	23	Dry

Table 3b. High Flow Water Quality – North Fork Mesa Creek

Parameter	***Units***	***1980-84 Minimum***	***1980-84 Maximum***	***1980-84 Mean***	***5/22/2003***
Dissolved Solids	ppm	194	252	223	241
Conductance	umhos/cm	206	280	253	388
Nitrate	mg/l	0	0.11	0.06	0.27
Selenium	mg/l	0.001	0.002	0.002	0.000
Bicarbonate	mg/l	154	167	161	202
Carbonate	mg/l	0	0	0	0
Sodium	mg/l	2.7	7.5	4.5	9
Calcium	mg/l	26	45	37	46
Magnesium	mg/l	6	10	8	14
Potassium	mg/l	1.1	3.9	2.0	1.9
Chloride	mg/l	3	11	6	8
Sulfate	mg/l	5	11	8	6
Ammonia	mg/l	0.06	0.24	0.15	0.05
Phosphate	mg/l	0	0	0	0.02
Turbidity	NTU	18	22	20	13
pH	SU	7.6	8.3	7.9	8.10
Flow	CFS	27	42	32	4.02
Temperature	Celsius	5	17	11	15

Table 4a. Low Flow Water Quality – South Fork Mesa Creek.

Parameter	***Units***	***1979-84 Minimum***	***1979-84 Maximum***	***1979-84 Mean***	***7/21/2003***
Dissolved Solids	ppm	202	302	252	Dry
Conductance	umhos/cm	405	707	527	Dry
Nitrate	mg/l	0	0.035	0.018	Dry
Selenium	mg/l	0.005	0.013	0.009	Dry
Bicarbonate	mg/l	204	264	234	Dry
Carbonate	mg/l	0	0	0	Dry
Sodium	mg/l	10	69	35	Dry
Calcium	mg/l	34	55	44	Dry
Magnesium	mg/l	18	31	25	Dry
Potassium	mg/l	1.13	5.7	3.5	Dry
Chloride	mg/l	2.8	13	7	Dry
Sulfate	mg/l	18	120	56	Dry
Ammonia	mg/l	0.3	0.58	0.44	Dry
Phosphate	mg/l	0.015	0.125	0.07	Dry
Turbidity	NTU	30	41	36	Dry
pH	SU	8	8.5	8.1	Dry
Flow	CFS	0.09	4.7	1.2	Dry
Temperature	Celsius	15	31	24	Dry

Table 4b. High Flow Water Quality – South Fork Mesa Creek

Parameter	***Units***	***1980-84 Minimum***	***1980-84 Maximum***	***1980-84 Mean***	***5/29/2003***
Dissolved Solids	ppm	286	306	296	234
Conductance	umhos/cm	324	367	345	370
Nitrate	mg/l	0	0.085	0.043	0.43
Selenium	mg/l	0.001	0.005	0.003	0.000
Bicarbonate	mg/l	194	220	207	213
Carbonate	mg/l	0	0	0	0
Sodium	mg/l	3.53	7.3	5.4	6.8
Calcium	mg/l	46	53	48	39
Magnesium	mg/l	11	14	13	18
Potassium	mg/l	1.6	2.3	2.1	2.3
Chloride	mg/l	2	4	3	4
Sulfate	mg/l	5	18	10	7
Ammonia	mg/l	0.06	0.19	0.13	0.00
Phosphate	mg/l	0	0	0	0.01
Turbidity	NTU	44	150	97	23
pH	SU	7.1	8.5	8.0	7.8
Flow	CFS	15	45	25	3.8
Temperature	Celsius	10	18	12	19

Table 5a. Low Flow Water Quality – Atkinson Creek.

Parameter	***Units***	***1980-84 Minimum***	***1980-84 Maximum***	***1980-84 Mean***	***2003 Summer***
Dissolved Solids	ppm	472	486	479	Dry
Conductance	umhos/cm	552	898	753	Dry
Nitrate	mg/l	0.0	0.0	0.0	Dry
Selenium	mg/l	0.0	0.0	0.0	Dry
Bicarbonate	mg/l	306	325	316	Dry
Carbonate	mg/l	0	0	0	Dry
Sodium	mg/l	26.0	84.0	44.3	Dry
Calcium	mg/l	36	66	49	Dry
Magnesium	mg/l	29	48	40	Dry
Potassium	mg/l	4.4	14.0	7.7	Dry
Chloride	mg/l	7	16	11	Dry
Sulfate	mg/l	53	120	94	Dry
Ammonia	mg/l	0.3	0.3	0.3	Dry
Phosphate	mg/l	0.0	0.2	0.1	Dry
Turbidity	NTU	1.8	5.0	3.4	Dry
pH	SU	7.5	8.5	8.0	Dry
Flow	CFS	0.0	1.3	0.4	Dry
Temperature	Celsius	15	25	19	Dry

Table 5b. High Flow Water Quality – Atkinson Creek

Parameter	***Units***	***1980-84 Minimum***	***1980-84 Maximum***	***1980-84 Mean***	***6/3/2003***
Dissolved Solids	ppm	302	370	336	234
Conductance	umhos/cm	460	562	501	370
Nitrate	mg/l	0.0	0.0	0.0	0.43
Selenium	mg/l	0.0	0.0	0.0	0.000
Bicarbonate	mg/l	253	270	262	213
Carbonate	mg/l	0	0	0	0
Sodium	mg/l	8.1	19.0	14.1	6.8
Calcium	mg/l	53	59	55	39
Magnesium	mg/l	19	228	74	18
Potassium	mg/l	3.0	4.1	3.6	2.3
Chloride	mg/l	4	6	5	4
Sulfate	mg/l	15	48	37	7
Ammonia	mg/l	0.1	0.1	0.1	0.00
Phosphate	mg/l	0.0	0.0	0.0	0.01
Turbidity	NTU	58	145	102	23
pH	SU	7.8	8.5	8.3	7.8
Flow	CFS	3.8	14.0	7.8	3.8
Temperature	Celsius	15	19	16	19

Table 6 Colorado Unified Watershed Assessment Ranking

Watershed	Category Rank*	Category Ranking for BLM Portion of Watersheds	Rationale for ranking
14030004 Lower Dolores	1	4	- Healthy waters that need to be maintained for the species of concern: flannel mouth sucker, blue head sucker, round tail chub. - BOR project in Paradox valley - > 50% federally managed - unit predominantly in Colorado
14030003 San Miguel	1	not ranked	- low priority segments in headwaters are on the 303(d) list - >50% federally managed - 319 project in Dry Creek

* Unified Watershed Assessment ranking are defined as:
Category 1: watersheds in need of restoration
Category 2: watersheds meeting goals, including those needed action to sustain water quality
Category 3: watershed with Pristine/Sensitive Aquatic System Conditions on lands administered by federal, state, or tribal governments
Category 4: Watersheds with insufficient data to make an assessment

None of the stream or river segments within the landscape unit are on the state's 303(d) list for impaired water quality or the Colorado Monitoring and Evaluation List for suspected impairment. However, Colorado's Unified Watershed Assessment, 12/1998, ranked both 14030004 and 14030003 4th field watersheds as Category 1, defined as "Watersheds in Need of Restoration". Only portions of these 4th field watersheds are within the boundary of the landscape unit. Although, less than optimal conditions on portions of the landscape unit may be a factor for the Category 1 rankings, land issues outside of landscape unit have also contributed to the need for watershed restoration (see Table 6).

In addition to the state's water quality designations, classifications and numeric standards, all surface waters of the State are subject to the Basic Standards (Colorado Water Quality Control Commission), which in part read: state surface waters shall be free from substances attributable to human-caused point or nonpoint source discharge in amounts, concentrations or combinations that:

1.Can settle to form bottom deposits detrimental to the beneficial uses (e.g. silt and mud).
2. Are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life.
3. Produce a predominance of aquatic life.

Summer flooding on tributary drainages, can deliver large sediment loads to the San Miguel and Dolores Rivers, which is especially a concern in the summer months when upstream flow regulation and/or diversions (CC Ditch on the San Miguel River, and McPhee Reservoir on the Dolores River) significantly deplete flows, and the rivers capacity to transport delivered sediment loads. The potential effects of sediment overload to the San Miguel and Dolores River's, include alterations to channel morphology, and the aquatic biology.

Suspended sediment (SS) data from the LHA area stream is Table 7. All of the area's streams show lower SS concentrations than the historic average on the larger rivers in Western

Colorado. These samples were mostly collected in the early 1980's, during the snowmelt recess and low summer flow seasons, when sediment concentrations are not at their maximum. Additionally, the collection of streams/rivers used for the Western Colorado average are much larger stream systems than the LHA streams. Thus, comparing the two data sets should be done with these facts in mind. When, comparing sediment concentration data between streams in the LHA, the South Fork of Mesa Creek shows to be the highest producer. Data to evaluate the potential effects of accelerated sediment concentrations on the aquatic biology has not been collected.

Table 7 Suspended Sediment Concentrations of Landscape Area Creeks compared to Regional Average

Stream	Sample Period	Sample #	Sample Season	Average Flow (cfs)	Average Suspended Sediment (ppm)
Mean of 18 sites in Western Colorado[1]	1914-57	unknown	yearlong	3541	724
North Fork Mesa Creek	1982	4	Spring	28	168
	1979-81	4	Summer	1.9	44
South Fork Mesa Creek	1982	4	Spring	12.9	436
	1980-81	2	Summer	2.4	73
Atkinson Creek	1980-82	2	Spring	3.7	147
	1980-81	2	Summer	0.69	70
Tabequache Creek	1981-82	3	Spring	163	109
	1981	1	Summer	0.7	100

1 – Data from 18 sites in the Upper Colorado River Basin in Western Colorado, in: Water Resources of the Upper Colorado River Basin-Technical Report, United States Geological Survey, Geological Survey Professional Paper 441, 1965

Ground water on the LHA is limited with the most water bearing geologic formations being the Dakota and Morrison formations. Groundwater in these formations is extensive over the west side of the Uncompahgre Plateau. The recharge areas are the higher elevations along the top of the plateau. Water quality in these formations is usually affected by excessive total dissolve solids. Water wells in the area are mostly developed in these formations. Small alluvial aquifers are also found in the LHA, usually being associated with stream systems.

METHODS

The land health assessment was conducted on public lands in the Mesa Creek LHA Unit during July and August of 2003, and March of 2004. The following procedure was used:

1). The area was first broken apart into 91 different polygons. Polygons were based on Ecological Sites derived from soil mapping units and allotment boundaries. Polygons ranged from 6 to 9,703 acres in size.

2). The interdisciplinary team ranged between 6-8 people. At the beginning of the field work period, the entire team worked together collecting data, in order to gain consistency. Afterwards data was collected primarily by interdisciplinary teams of three people.

3). Each polygon was visited in the field, and land health assessment forms were used to describe the plant community characteristics, and various soil and community health attributes. Polygons were evaluated at a number of sites (ranging in number between 1 and 6) spread across the polygon, based on the size of the polygon. The sites were predetermined on maps, and not subjectively chosen in the field. Data collection occurred in the field. Nearly every point was mapped by a GPS unit in the field. A photo of each site was also taken.

4). Riparian Proper Functioning Condition (PFC) data was collected at points along nearly all perennial and intermittent streams during the summer of 2003. Where data was not collected in 2003, PFC data from 1995 was used. This data was used to address Standard 2.

5). In addition to the PFC data, water chemistry was analyzed, and macroinvertebrate samples were collected in 2003 at the PFC points where there was live water. Qualitative data on sediment and water quality was also collected at these points. On ephemeral or intermittent drainages, qualitative data on likely sediment production was also collected. Standard 5 was evaluated using this data in association with the PFC data and upland health assessment data. This data was evaluated against Colorado's stream water quality designations.

6). A comprehensive weed inventory of the Mesa Creek LHA area was conducted in the summers of 2003 and 2004. All likely sites for weed invasion were visited in the field, and weed infestations that were found were documented and data entered into GIS. These likely sites for invasions included known soil disturbances, drainages and travel corridors.

7). Data from the field forms was entered into an ACCESS database, and polygons and stop points from the maps were entered into ARCVIEW. The databases were then linked to the polygons and to the stop points to provide a system that allows maps to be made based on any of the data attributes collected. Mean values of groundcover and plant growth form cover were calculated for each ecological site type (unique combinations of ecological site, slope and aspect). These mean values were then used as a standard of comparison to assess each individual site.

8). A final determination for Standards 1 and 3 for each polygon was made by the ID team. This was done by identifying problems (either low range health indicator scores of 1 or 2), or by finding lower than average values for the ecological site type, for either plant cover (for perennial warm season grasses, perennial cool season grasses, and perennial forbs) or groundcover. Problems were defined as a score of 1 or 2 for the following health indicators: runoff drainages, pedestals, plant distribution, community diversity, exotic plants, noxious weeds, or litter retention; or for scores of less than average for soil cover or plant cover or vigor attributes. The ID team judged each polygon as to whether it was meeting the standard (no evident problems at any site in the polygon), not meeting the standard (problems at one half or the majority of sites in the polygon), or meeting with problem areas (problems at less than half of

the stops in polygon), based on a preponderance of evidence. The "meeting with problem areas" category has been used in past land health assessments, and denotes polygons which on balance meet a health standard, but have some indicators or locations within them that the ID team would like to see tracked and managed for improvement.. Reasons for the rankings, and likely causes were documented. Riparian Functioning at Risk ratings were directly translated into "Meeting With Problems", as they had been in past land health assessments.

9). Polygon rating (Meeting, Not Meeting, Meeting With Problems) was then entered into the ARCVIEW polygon map attribute table which also contained attribute fields to document reasons for the rating, and to list causes. Causes for polygons not meeting or meeting with problems for any standard were discussed by an ID team. Evidence considered included observations made on the site of possible disturbances, grazing dates, actual use, records of past treatments, and proximity to roads and recreational or mining related disturbance.

10). Numerous maps were created showing the locations of different types of problems across the assessment area, based on the data collected at sample points.

11). Large scale health issues were assessed by using a remotely sensed vegetation map (from 1993 Landsat imagery) and the desired landscape map that has been developed through the fire planning process, in addition to wildlife population data.

12). Standard 4 was rated based on existing location data of special status species and Colorado BLM's listed species of concern together with habitat needs data and the data from the Rapid Assessment

RESULTS

Standard 1:

Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic process. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.

*Indicators used to assess this standard include: rills and **pedestals**, active **gullies**, appropriate **groundcover** and plant canopy cover, **litter accumulation**, **litter movement**, appropriate soil organic material, plant species diversity and vigorous, desirable plants.* [*]

[*] *bold text identifies the indicators which were most important for this assessment*

Acreage Figures

Meeting Standard 1		**Not Meeting Standard 1**	**Unknown**	**Water or other N/A**
Meeting	Meeting with problems			
59,931	50,507	1,005	2,027	181

See figure 2.1 for locations of problem polygons.

Specific Problems

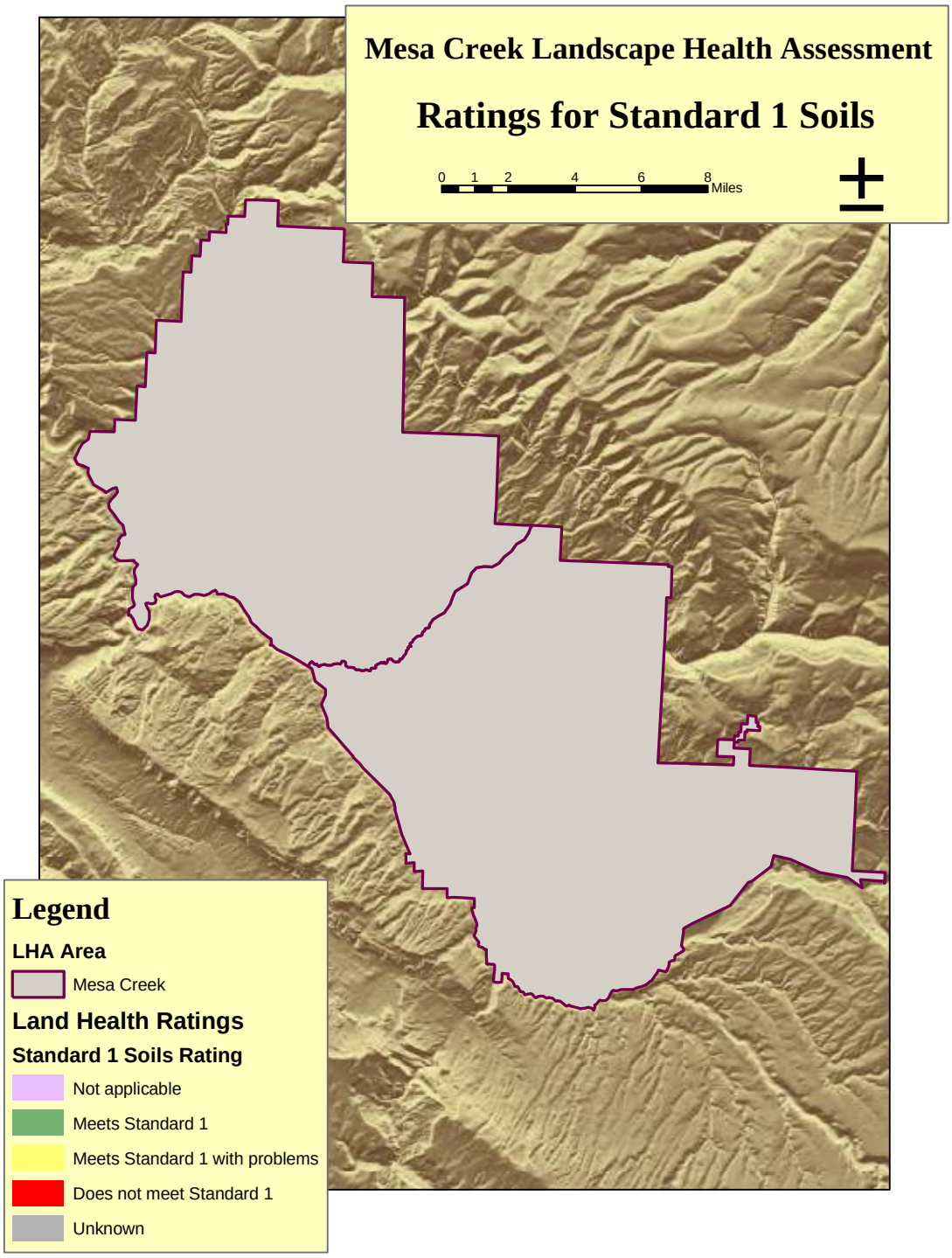
Active Soil Erosion-Pedestals and Gullies

Soil erosion is a concern because it reflects loss of site productivity and potential that usually cannot be regained for centuries of more. Gullies along with other downcutting or widening channels, and the formation of pedestals on the soil surface were two primary indicators used to evaluate active soil erosion. Gullying was only noted at five widely scattered locations and was mostly associated with the edges of pediments that were eroding into the Mancos shale badlands (see Figure 2.2). Overall, pedestalling was not a significant problem in the unit. Two areas in the central part of the unit each had several sites with active pedestalling, but again, much of this seemed to be associated with the very erosive badlands.

Active Soil Erosion–Runoff Drainages

Runoff drainages or rills occur where water fails to infiltrate into the soil and instead runs off the site as overland flow. Water running over the soil surface is often an important source of soil erosion, carrying off soil particles as it goes. An additional concern is that water, by not entering into the soil, is unavailable for plant growth. This results in even lower productivity in an area that is already constrained by a dry climate. As with pedestals and gullies, runoff drainage problems were relatively insignificant across the unit (Figure 2.3). The same two areas having pedestalling problems had more sites with runoff drainage problems. Again, much of this was in association with the erosive badlands in these locations.

Figure 2.1 Standard 1 Polygon Ratings



Active Soil Erosion-Pedestals and Gullies

Soil erosion is a concern because it reflects loss of site productivity and potential that usually cannot be regained for centuries or more. Gullies along with other downcutting or widening drainage channels, and the formation of pedestals on the soil surface were the primary indicators used to evaluate active soil erosion. Although most sites visited did not have active soil erosion problems, gullying was noted to be significant at four areas in the central part of the LHA unit (see Figure 2.2). Pedestals were also found to be a problem at several sites in the central part of the unit.

Active Soil Erosion–Runoff Drainages

Runoff drainages occur where water fails to infiltrate into the soil and instead runs off the site as overland flow. Water running over the soil surface is an important source of soil erosion, carrying off soil particles as it goes. An additional concern is that water, by not entering into the soil, is unavailable for plant growth. This reduces productivity in an area that is already constrained by a dry climate. As with pedestals and gullies, runoff drainage problems were minor across the unit (Figure 2.3). However, several areas in the central part of the unit had multiple sites with runoff drainage problems. While some of these areas were on steep slopes which typically decrease infiltration and increase the velocity and erosive force of runoff, other problem areas were on flatter parts of the landscape where water should infiltrate into the soil more readily.

Elevated Bare Soil Levels

Bare soil is that part of the ground surface that is not protected by rock, plant basal area, cryptogamic crust, or litter. Bare soil is vulnerable to the erosive forces of water and wind. The percent cover of bare soil was an important indicator used to evaluate the soil's vulnerability to erosion. Excessively high bare soil is a widespread problem across the unit (Figure 2.4). Many of sites sampled had excessively high bare soil as compared with the average values for the ecological sites. Concentrations of problem sites were found on Spring Creek and Atkinson Mesas, Tabeguache, Third Park, Naturita and Bucktail areas.

High Soil Erosion Hazard

High erosion hazard ratings indicate areas that are especially vulnerable to soil erosion. Erosion hazard combines soil texture with amount of bare soil and slope to create an index of vulnerability. Several high and moderate risk sites were found across the north central part of the unit, and in smaller areas in the central and southern parts of the unit (Figure 2.5).

Low Plant Basal Cover

Plant basal cover is one of the best sources of soil protection since it protects the soil surface from wind and water erosion, and binds soil particles together with roots. The percent of ground covered by the crowns of perennial plants (basal area) was used as an important indicator of the level of soil protection. In addition to elevating the risk of soil erosion, low basal cover is a concern because the site is producing less vegetation, less vigorous vegetation, or a different type of vegetation than it is capable of producing. Low basal cover is a widespread problem across the unit (Figure 2.6). Large areas typified by lower than average plant basal cover were found throughout the unit.

Low Litter Cover

Litter cover is another plant-related source of soil protection. Although fine litter tends to be less permanent that plant basal cover, it serves to protect the soil surface and enhance water infiltration by slowing movement of overland flow. In addition, as litter decomposes, it adds to

the organic material in the soil, increasing soil productivity. Low litter cover was another widespread problem in the unit (Figure 2.7). Numerous areas throughout the unit had concentrations of sites with lower than average litter.

Figure 2.2 Mesa Creek LHA Area soil loss problems: map shows all sites with gully activity (Rosgen type F and G channels), and soil pedestals (sites with scores of 1 or 2 on the Rangeland Health Indicators data sheet.)

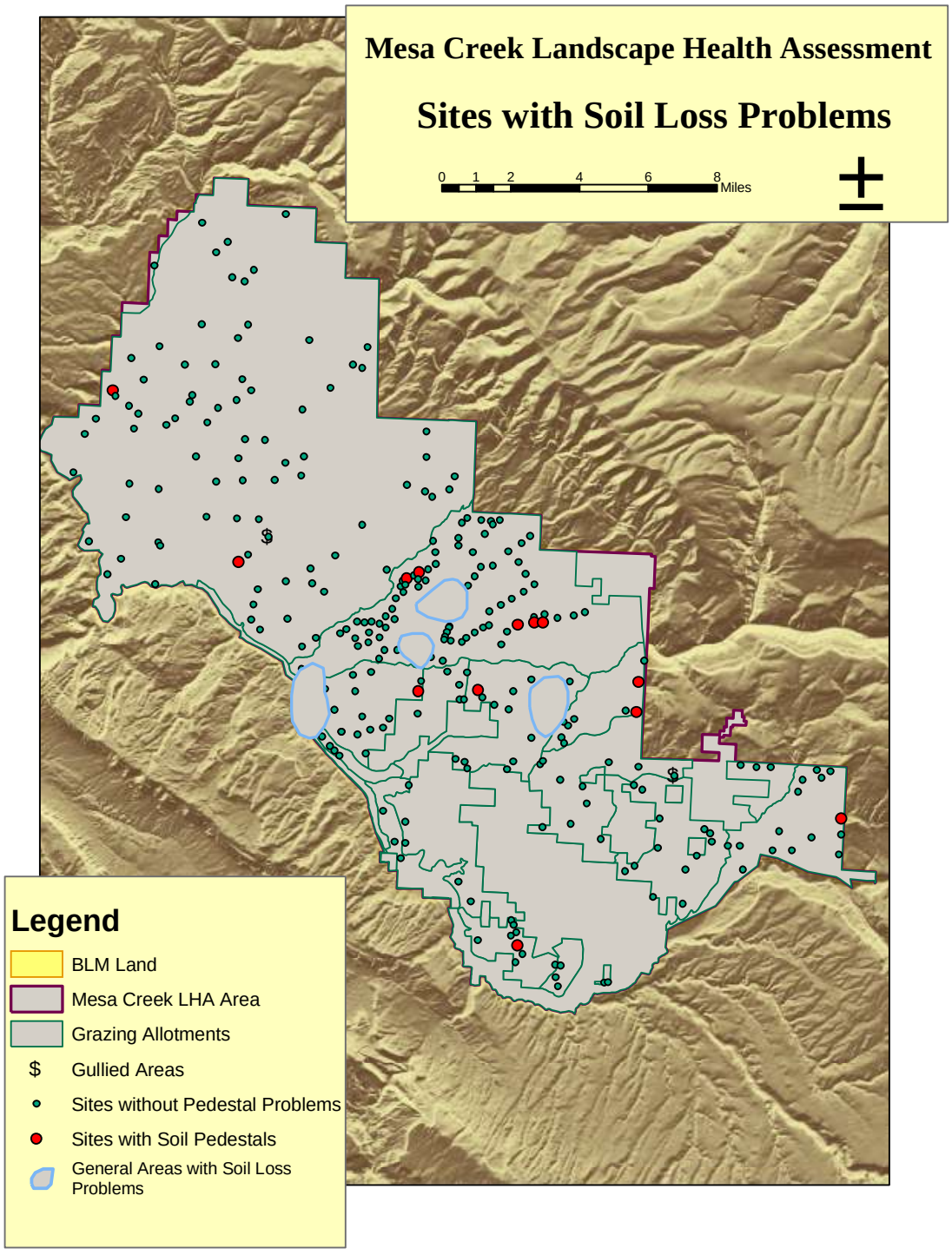


Figure 2.Mesa Creek LHA Area runoff drainages. Sites with soil loss associated with overland flow: runoff drainage scores of 1 or 2 on the Rangeland Health Indicator sheet are considered problem sites.

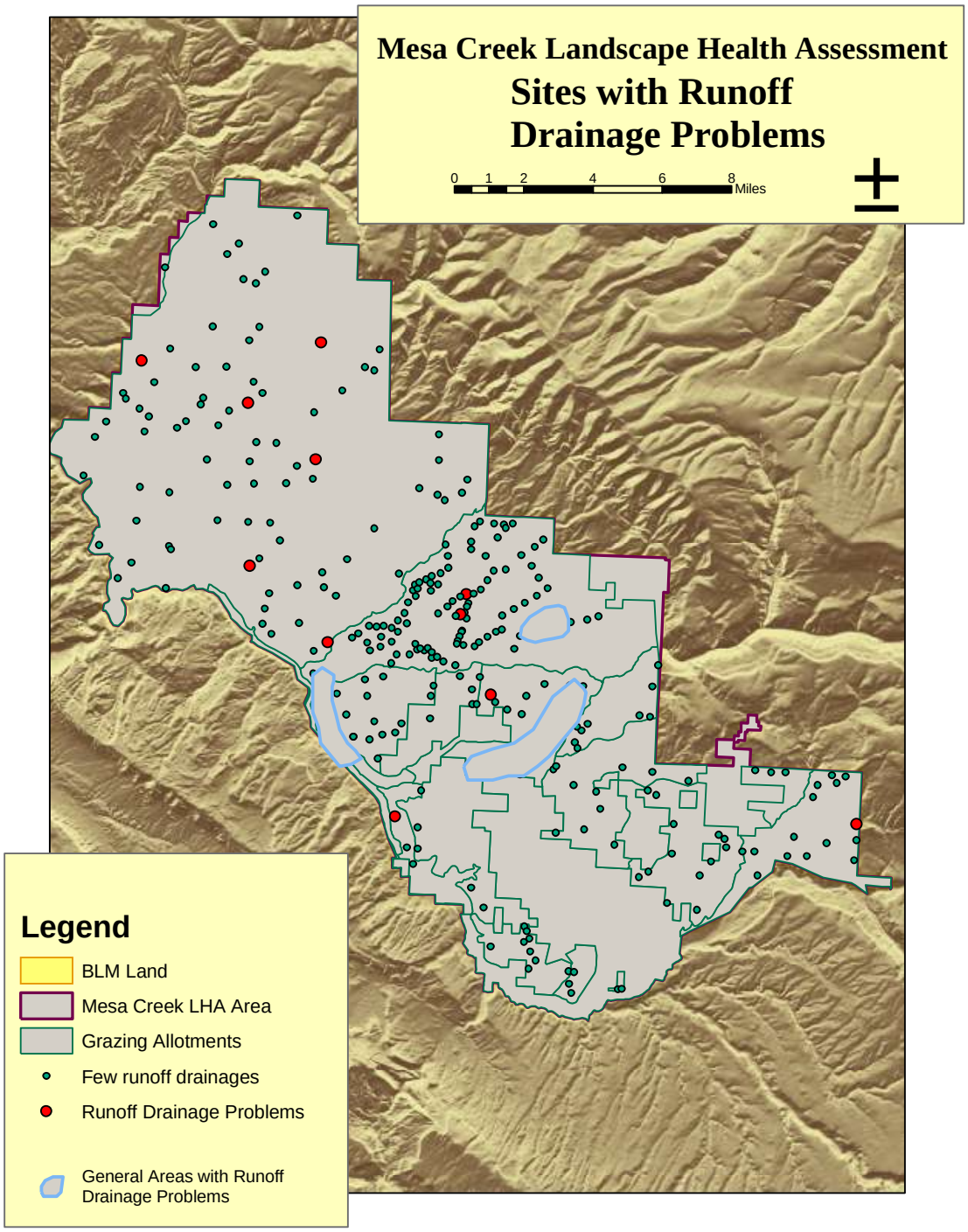


Figure 2.4 Mesa Creek LHA Area sites vulnerable to soil erosion because of high levels of bare soil: In this map, only sites having bare soil values of more than 10% above the average bare soil value for the site type are characterized as having high bare soil levels.

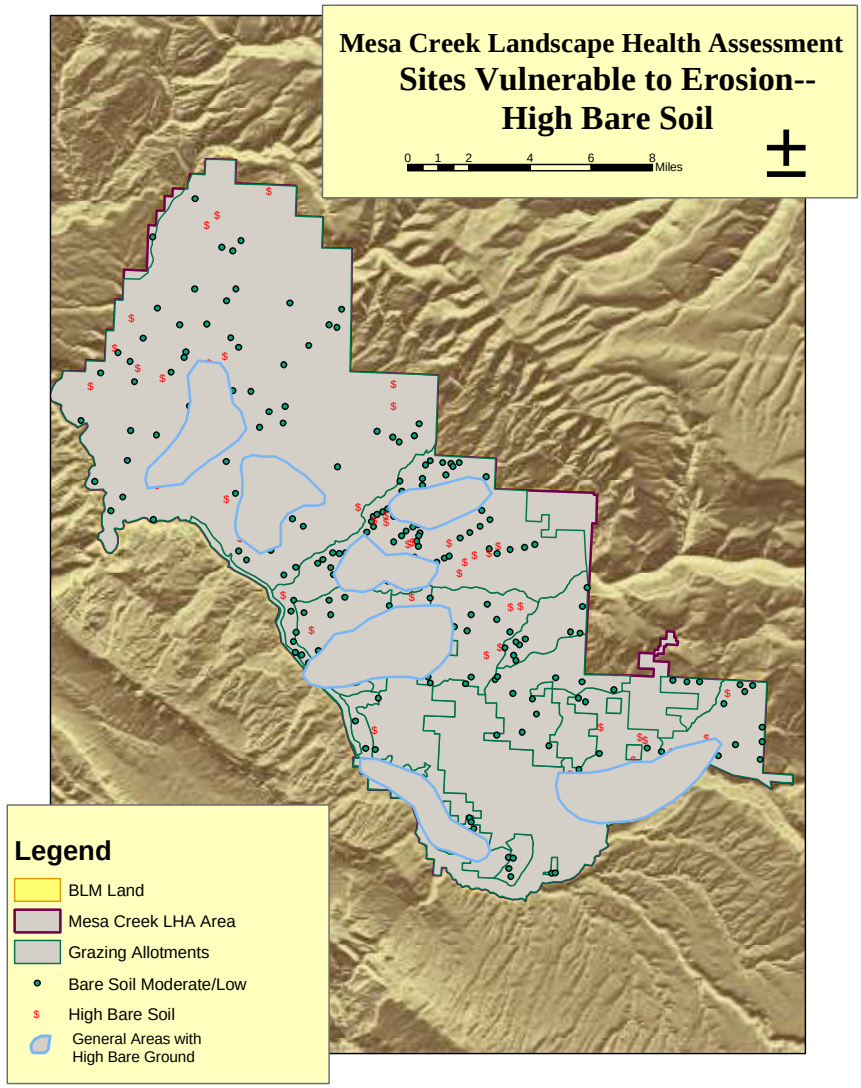


Figure 2.5 Mesa Creek LHA Area sites with high erosion hazard: soil k factor > 0.2, bare soil > 50%, and slopes > 8% at highest risk, slopes between 4 and 8% at moderate risk.

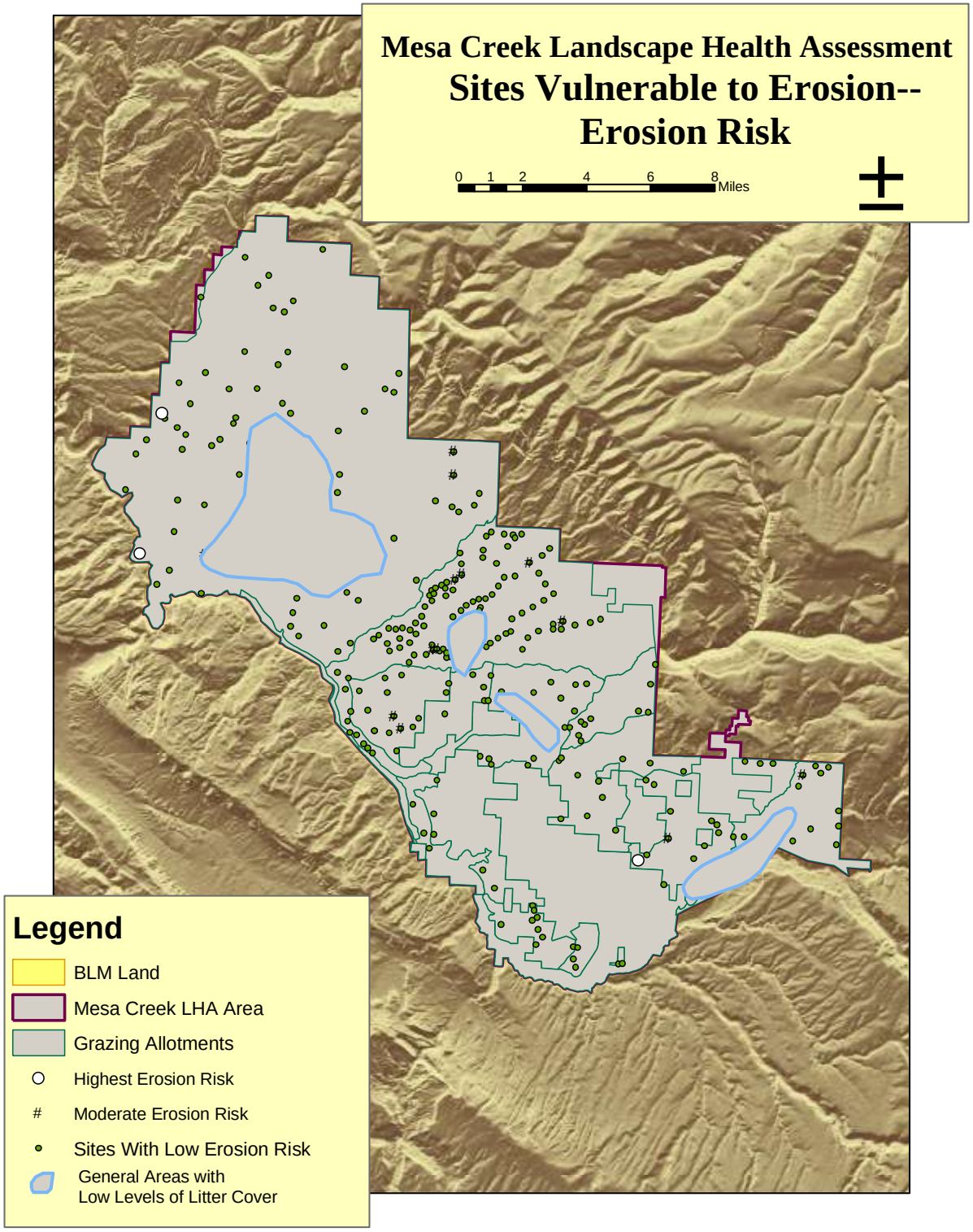

Mesa Creek Landscape Health Assessment
Sites Vulnerable to Erosion--
Erosion Risk
0 1 2 4 6 8 Miles
Legend
BLM Land
Mesa Creek LHA Area
Grazing Allotments
Highest Erosion Risk
Moderate Erosion Risk
Sites With Low Erosion Risk
General Areas with
Low Levels of Litter Cover

Figure 2.6 Mesa Creek LHA Area sites with less plant basal cover than average for the site type. In this map, only sites having basal cover values of less than 10% below the average basal cover value for the site type are characterized as having low basal cover.

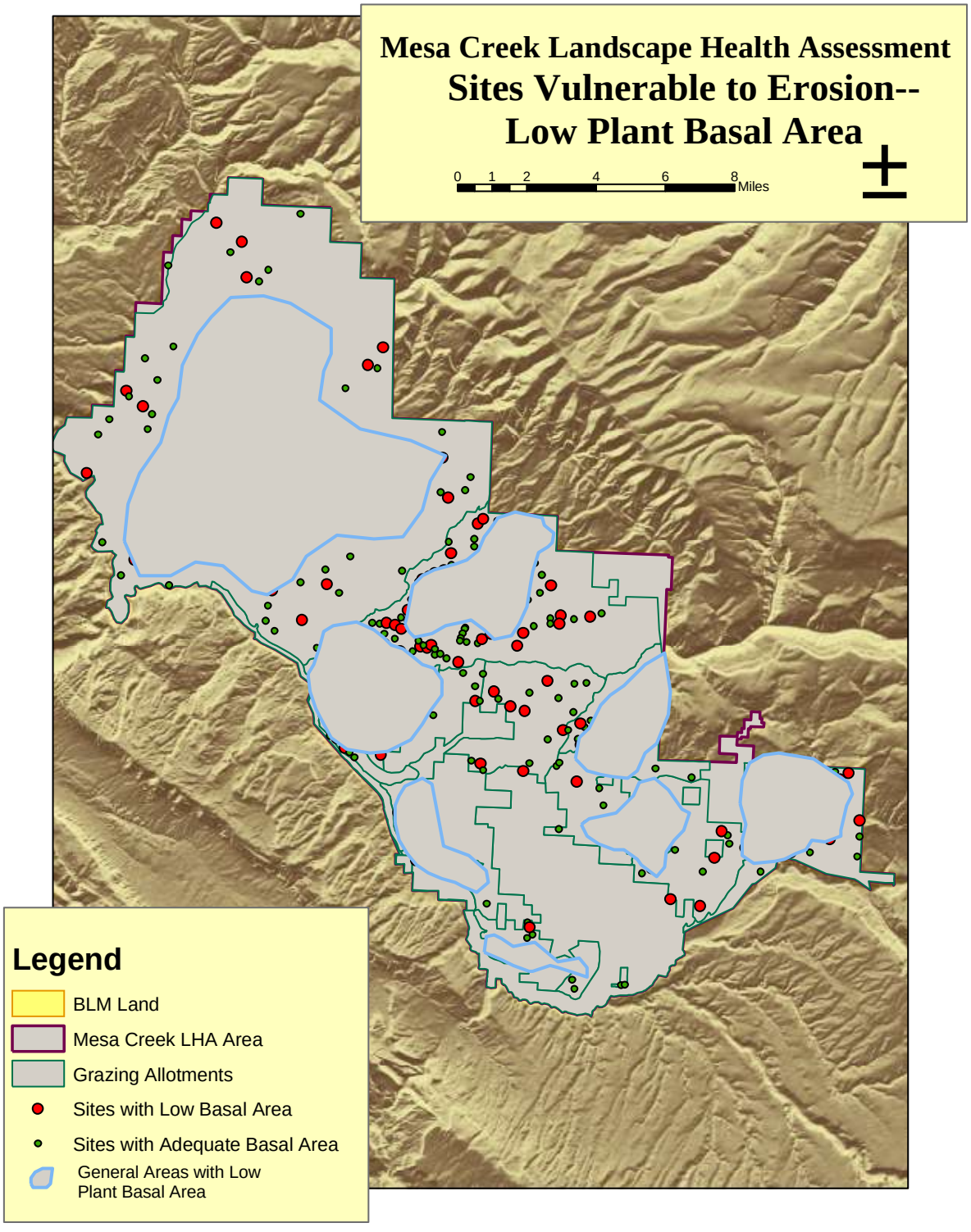
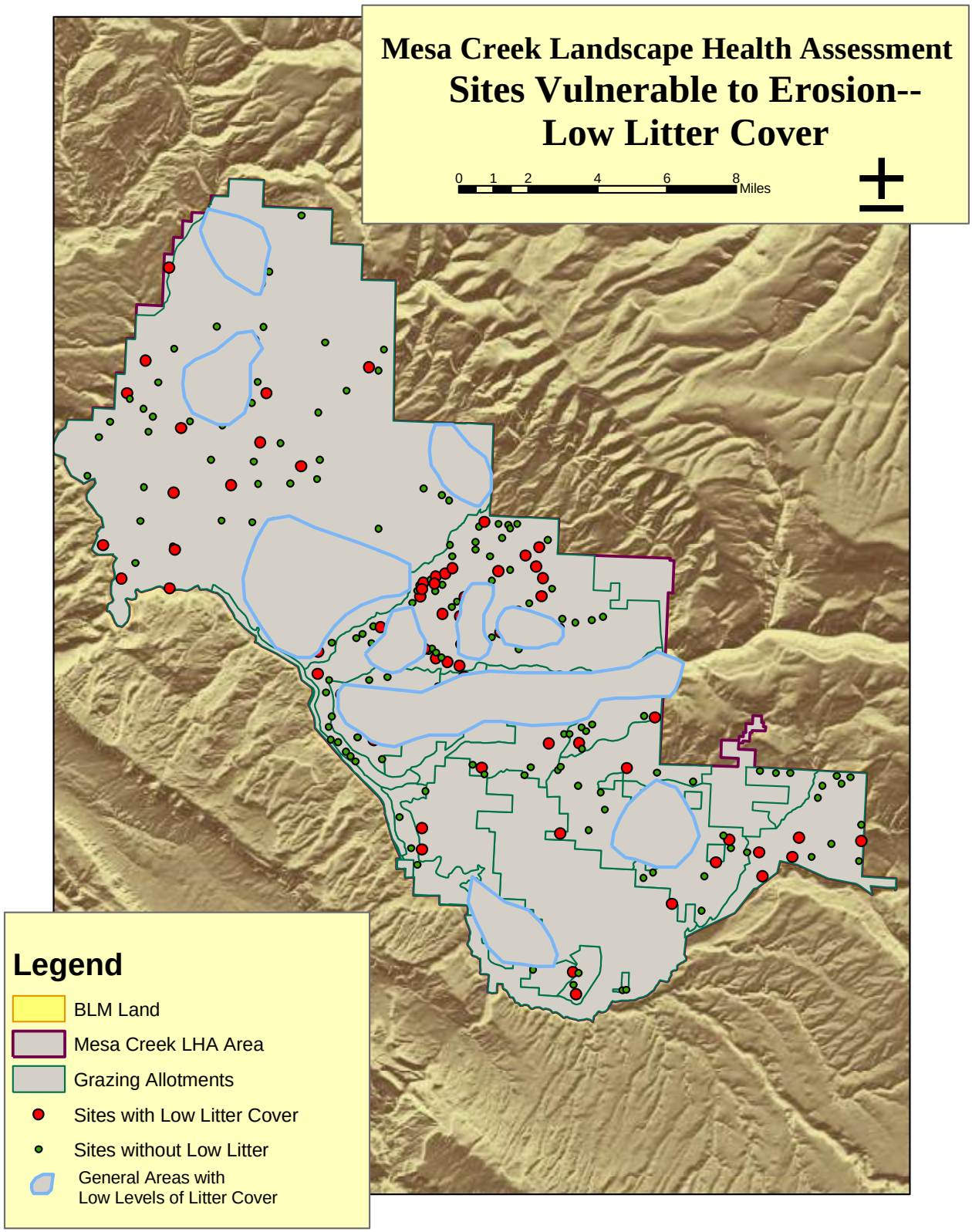

Mesa Creek Landscape Health Assessment
Sites Vulnerable to Erosion--
Low Plant Basal Area
0 1 2 4 6 8 Miles
Legend
BLM Land
Mesa Creek LHA Area
Grazing Allotments
Sites with Low Basal Area
Sites with Adequate Basal Area
General Areas with Low
Plant Basal Area

Figure 2.7 Mesa Creek LHA Area sites with lower litter cover than average for the site type. In this map, only sites having litter cover values of less than 10% below the average litter cover value for the site type are characterized as having low litter cover.


Mesa Creek Landscape Health Assessment
Sites Vulnerable to Erosion--
Low Litter Cover
0 1 2 4 6 8 Miles
Legend
BLM Land
Mesa Creek LHA Area
Grazing Allotments
Sites with Low Litter Cover
Sites without Low Litter
General Areas with
Low Levels of Litter Cover

Standard 2: *Riparian systems associated with both running and standing water, function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100 year floods. Riparian vegetation captures sediment, and provides forage, habitat and biodiversity. Water quality is improved or maintained. Stable soils store and release water slowly.*

Indicators used to assess this standard include: native or desirable vegetation dominant, vigorous vegetation, diversity of vegetation age classes, vertical and compositional structure, vegetation that has root systems capable of withstanding high stream flows, species that indicate maintenance of riparian moisture, stream in balance with water and sediment supplied from watershed, indications of high water tables, point bars colonized by vegetation in range of age classes, active floodplain, floodplain vegetation available to capture sediment and dissipate flood energies, appropriate channel meander patterns, woody debris a part of stream morphology where appropriate.

Mileage Figures

Meeting Standard 2		**Not Meeting Standard 2**	**Unknown**
Meeting	Meeting with problems		
48.3	18.5	8.4	0.0

See figure 3.1 for locations of problem streams.

Specific Problems

The majority of riparian areas on public land in the landscape unit fully met Standard 2, having no evident problems with hydrology, vegetation, or excessive erosion and deposition from either stream channel or from the watershed. Another 18.5 miles were rated as "functioning at risk", which is customarily translated into "meeting Standard 2 with problem areas". There were 8.4 miles of riparian areas that did not meet Standard 2. The stream reaches having problems are described here in more detail.

Mesa Creek, South Fork

A total of 10.9 miles of the South Fork of Mesa Creek passes through public land in the Mesa Creek LHA Area. Of this, 1.7 miles was rated as "Meeting with Problems" with a downward trend because of the condition of the riparian vegetation—particularly the woody vegetation-- which was heavily grazed. Sustained grazing at these levels will reduce the amount of riparian vegetation over time to levels which will be inadequate to protect the banks, and unsuitable for providing other riparian values. The lower reach of Mesa Creek has been rated as functioning properly, but there have been continuing problems of severe overgrazing within this reach. Long term health of the riparian community, bank stability, and habitat quality in this section of the stream will be damaged if grazing levels are not controlled more carefully.

Lower Dolores River

BLM land is interspersed with private land along the Lower Dolores River. Of the approximately 3 miles of

river which pass through the LHA area, only 1.4 miles occur on BLM. This reach was rated as "Meeting with Problems" with a downward trend because of some channel braiding and excess deposition within the channel. Additionally, tamarisk was a dominant component of the riparian vegetation, along with occasional patches of Russian knapweed. These aggressive weeds are likely to expand with disturbances like flooding or burning. As they do, they will cause further degradation of the riparian area, channel stability, and other riparian values. The effects of flow regulation were also apparent in the low flows observed.

Atkinson Creek

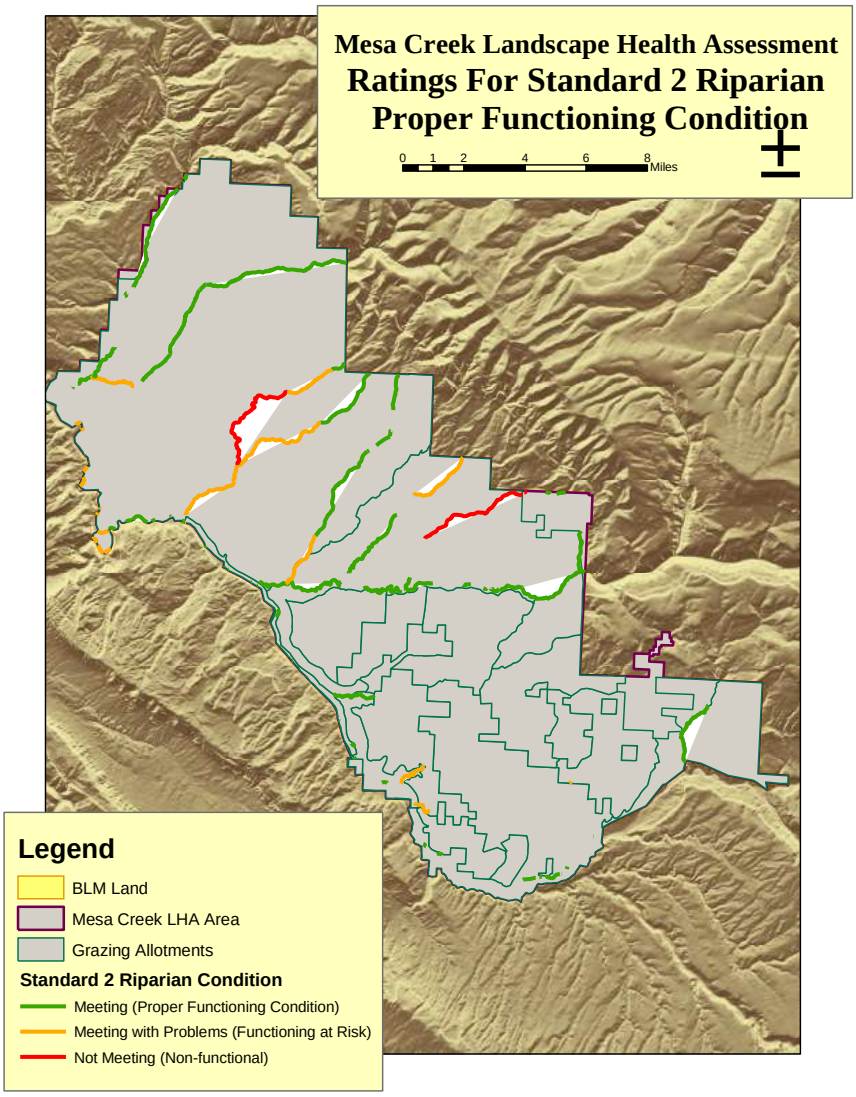
The main stem of Atkinson Creek is 2.8 miles long, and the entire stream is almost entirely on BLM. This reach was rated Functing At Risk because there were not diverse age classes of riparian vegetation present, vegetation was in low vigor, channel sinuosity and width depth ratios were not in balance with the landscape setting, and the channel showed lateral and vertical instability. Poor plant vigor, especially of woody species, appeared to be related to grazing. Bank trampling was also observed and contributed to channel problems.

West Atkinson Creek

This stream is 6.1 miles long and is all located on BLM land. Of this length, the lower reach is 4.3 miles and was rated as Nonfunctional, and the upper reach is 1.8 miles and was rated as Functioning At Risk. The lower reach

Is Campbell Creek non functional? jrf

Figure 3.1 North Delta Area Standard 2 ratings.



in November and September. However, for an intermittent stream it drains a small watershed. It is deeply downcut, and has minimal riparian vegetation, and scattered tamarisk. The source of flow is unclear – it may be augmented by irrigation return flow, or groundwater from irrigation. The watershed contains many breached erosion control dams, indicating that the area is subject to sudden, high runoff events. Observers were not able to identify the source of the problems, but noted that livestock use did not appear to be a contributing factor.

Oak Creek –lowest reaches

The lowest reach of Oak Creek makes up 0.6 miles of riparian vegetation on public land in the North Delta Area. This reach was rated as "not meeting Standard 2" because it is deeply downcut and channelized. Only a few individuals of a native riparian species (sandbar willow) were found, and they were in poor condition. Tamarisk was abundant. High flows were cited as causing damage to the stream. Poor upland condition may have been a factor in the original downcutting. Now the system is not capable of withstanding high flows without additional damage occurring.

Standard 3: *Healthy productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species' and habitats potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.*

Indicators used to assess this standard include: native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photo synthetic activity throughout growing season, resilience to human activities, appropriate plant litter accumulations, and landscapes composed of a variety of successional stages.

Acreage Figures

Meeting Standard 3		**Not Meeting Standard 3**	**Unknown**	**Water**
Meeting	Meeting with problems			
9,677	52,420	9,484	2,844	157

See figure 4.1 for locations of problem polygons.

Specific Problems

Perennial Grass Cover

Perennial grass is an important if not dominant plant type in most of the plant communities occurring in the unit. It is also one of the plant community components most reduced by historic and present day uses, especially grazing. Percent canopy cover of perennial grass relative to the average found for the site type was used as one indicator of plant community health and also as an indicator of wildlife habitat quality. Problems with low perennial grass cover were widespread across the North Delta Area (see Figure 4.2). Large areas where the majority of sites had low perennial grass cover were found in the eastern and south-central parts of the unit.

Cool Season Grass Cover

Cool season perennial grasses are those which are actively growing in the spring and fall months, and are generally dormant during the heat of the summer. On the majority of public lands in the Uncompahgre Resource Area, the cool season grasses have historically been the most diminished because the fall and spring seasons of grazing use coincide with their vulnerable, actively growing period. When cool season species are reduced in a plant community, the community loses productivity because spring and fall resources (sunlight and moisture) are not being fully used. In addition, cool season grasses use the same growing period as cheatgrass, and can compete with cheatgrass. The percent canopy cover of cool season perennial grass was used as an indicator of plant community health and wildlife habitat quality. As with perennial grasses, problems with low cool season grass cover were widespread across the unit (Figure 4.3). Large areas where the majority of sites had low perennial cool season grass cover were found in the eastern and central parts of the unit.

Perennial Forb Cover

Perennial forbs are a source of diversity, nectar, seeds, varied photosynthetic periods and root morphologies. These characteristics increase a community's water and sunlight capturing capabilities,

Figure 4.1 Mesa Creek LHA Area Standard 3 ratings

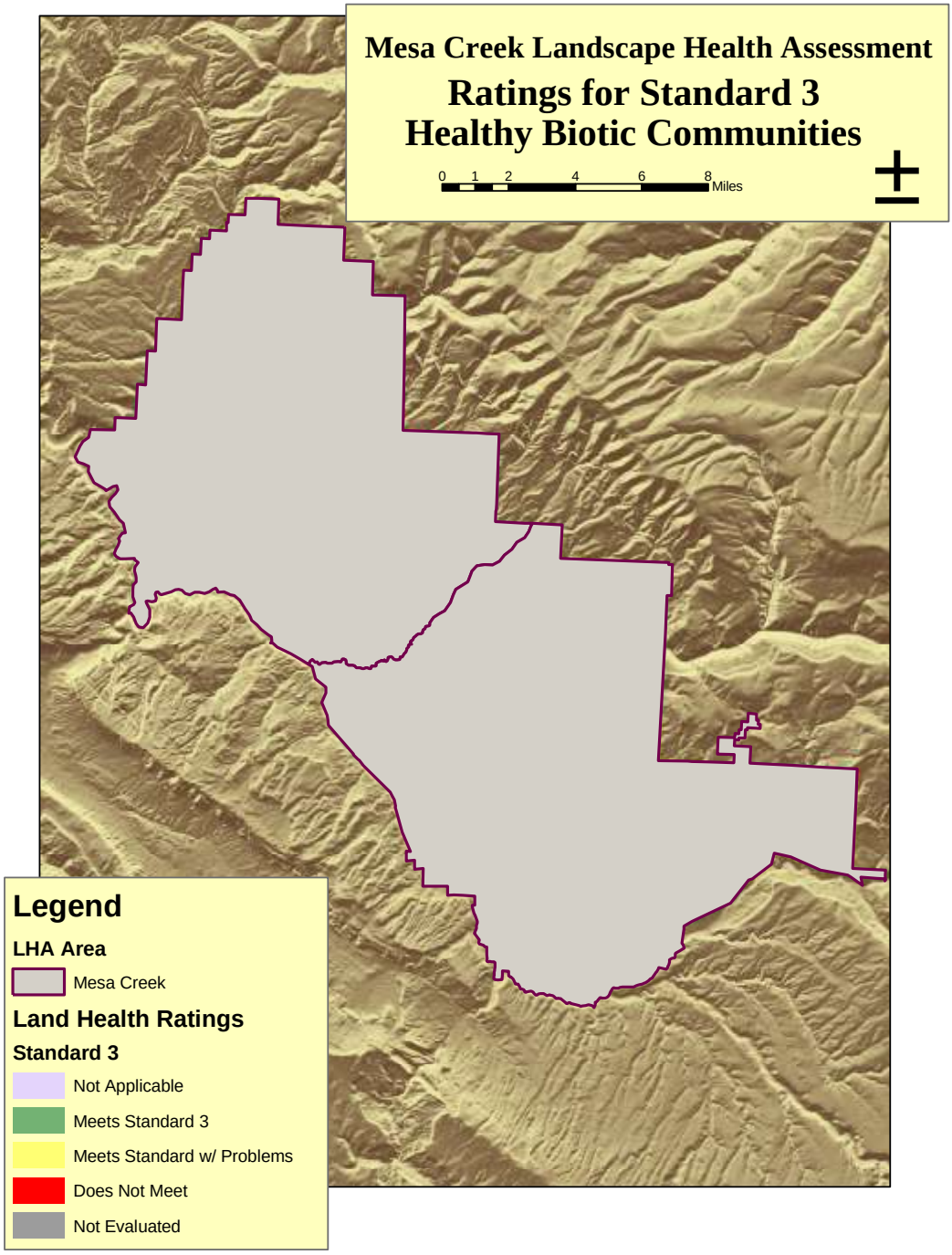


Figure 4.2 Mesa Creek LHA Area perennial grass cover. In this map, only sites having perennial grass canopy cover values of less than 10% below the average perennial grass cover value for the site type are characterized as having low grass cover.

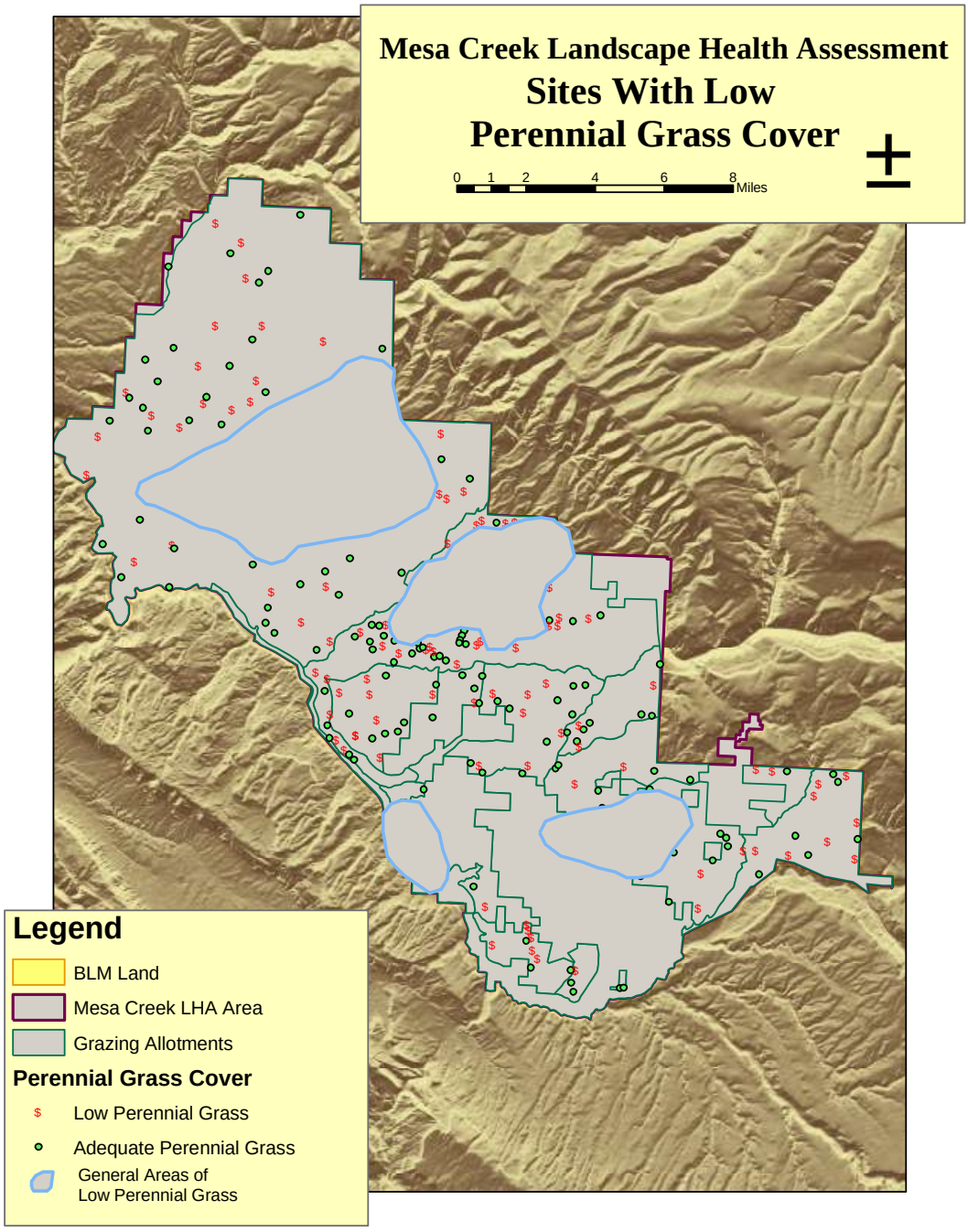
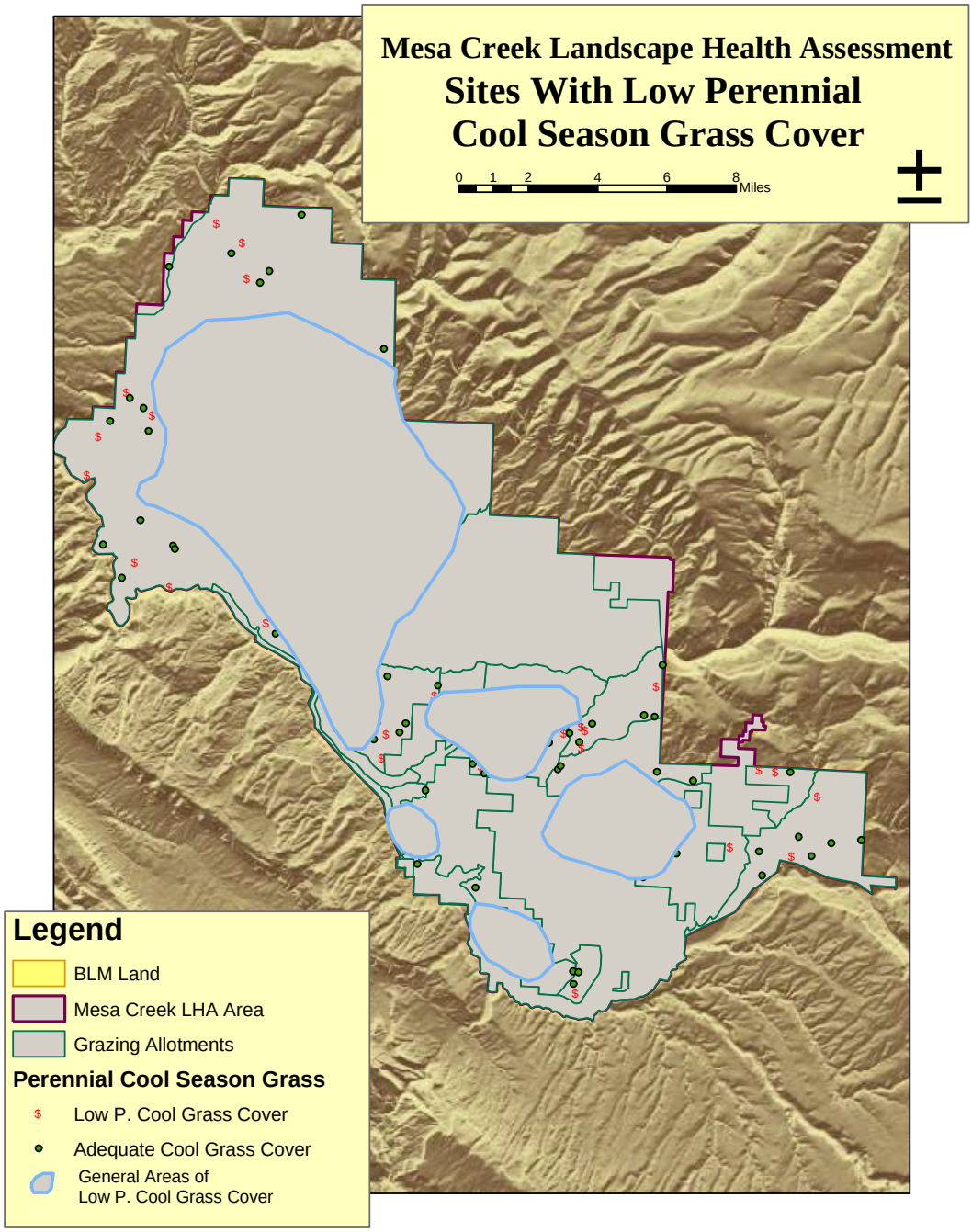


Figure 4.3 Mesa Creek LHA Area perennial cool season grass cover. On this map, only sites with perennial cool-season grass canopy cover values worse than 10% below the average value for the site type are shown as problem areas. Note that only half of the sites had data collected for cool season grass cover.



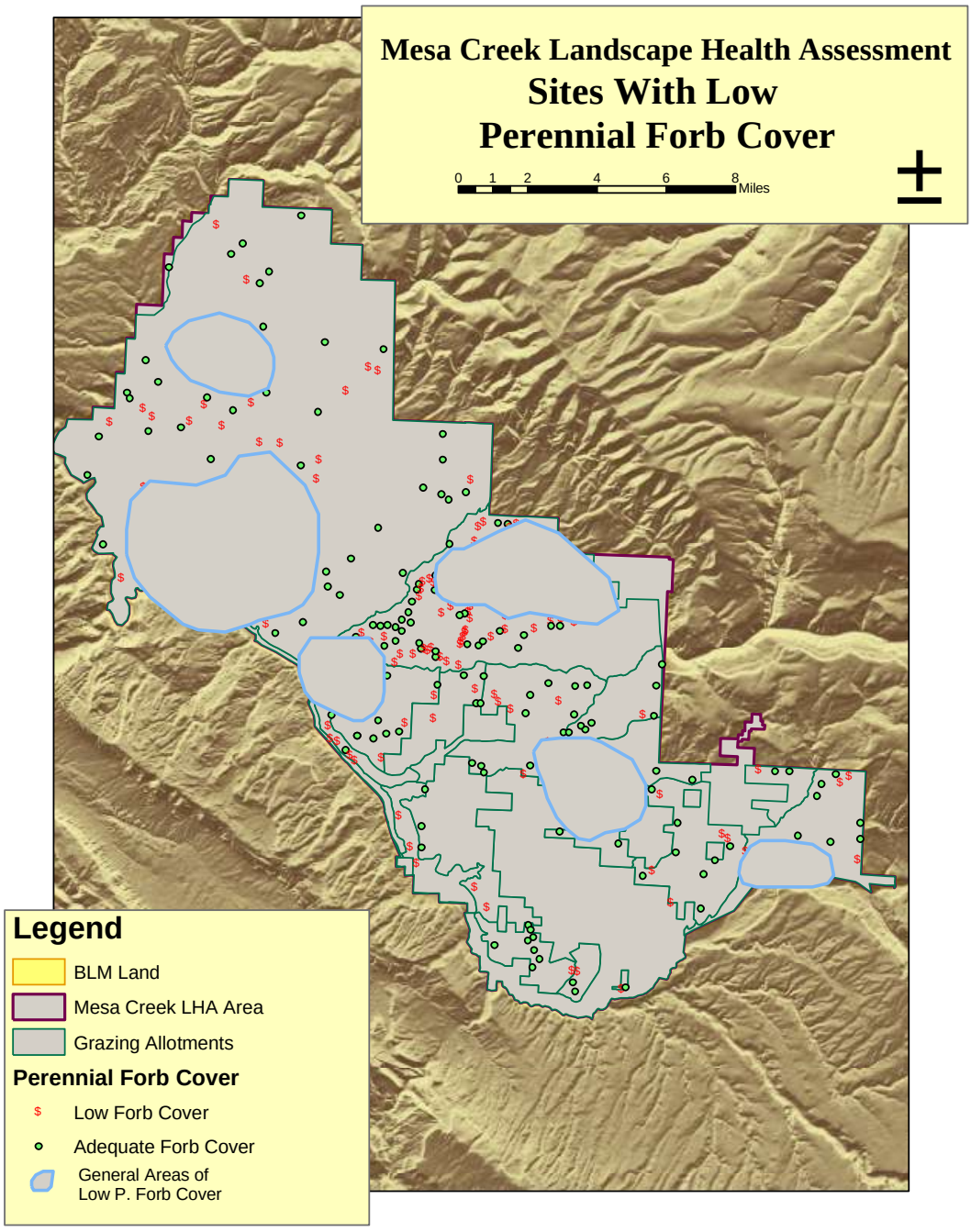

Mesa Creek Landscape Health Assessment
Sites With Low
Perennial Forb Cover
0 1 2 4 6 8 Miles
Legend
BLM Land
Mesa Creek LHA Area
Grazing Allotments
Perennial Forb Cover
Low Forb Cover
Adequate Forb Cover
General Areas of
Low P. Forb Cover

Figure 4.5 Mesa Creek LHA Area pinyon-juniper invasion. This map shows sites where young age classes of either pinyon or juniper were the dominant age classes of these species on the site.

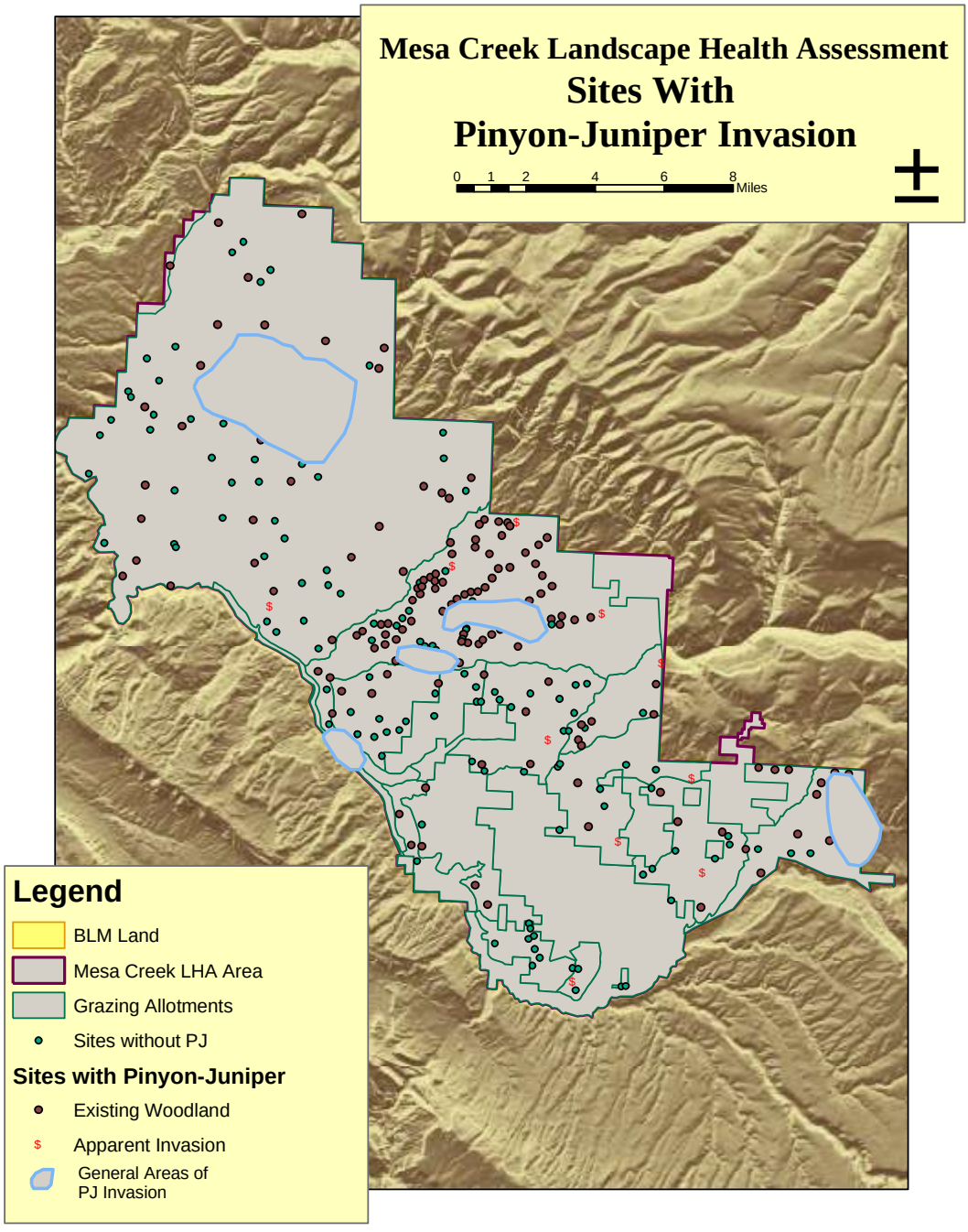


Figure 4.6 Mesa Creek Area exotic plants. This map shows sites with Rangeland Health Sheet scores of 1 or 2 as exotics dominant, scores of 3 as exotics present, and scores of 4 or 5 as exotics minimal.

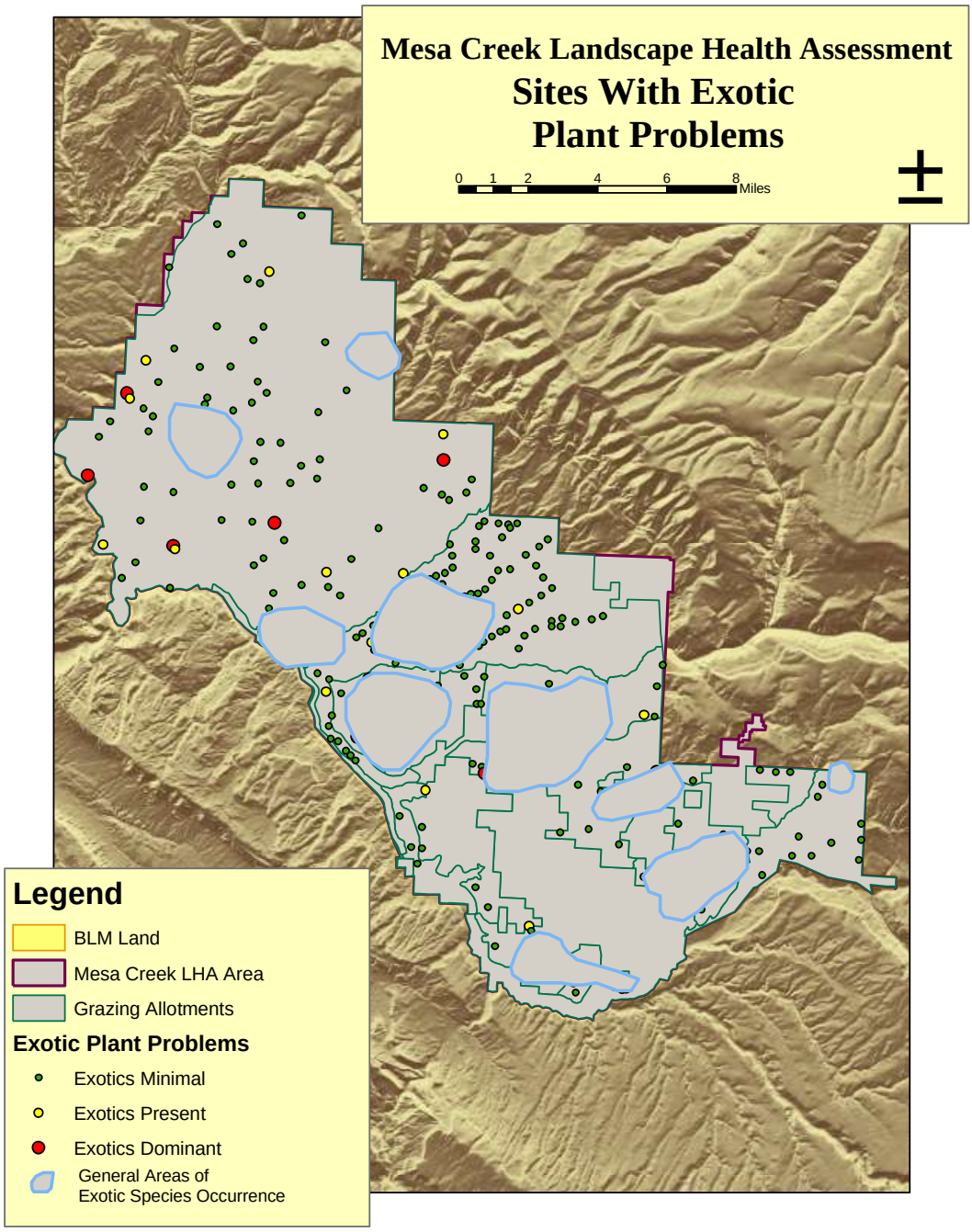
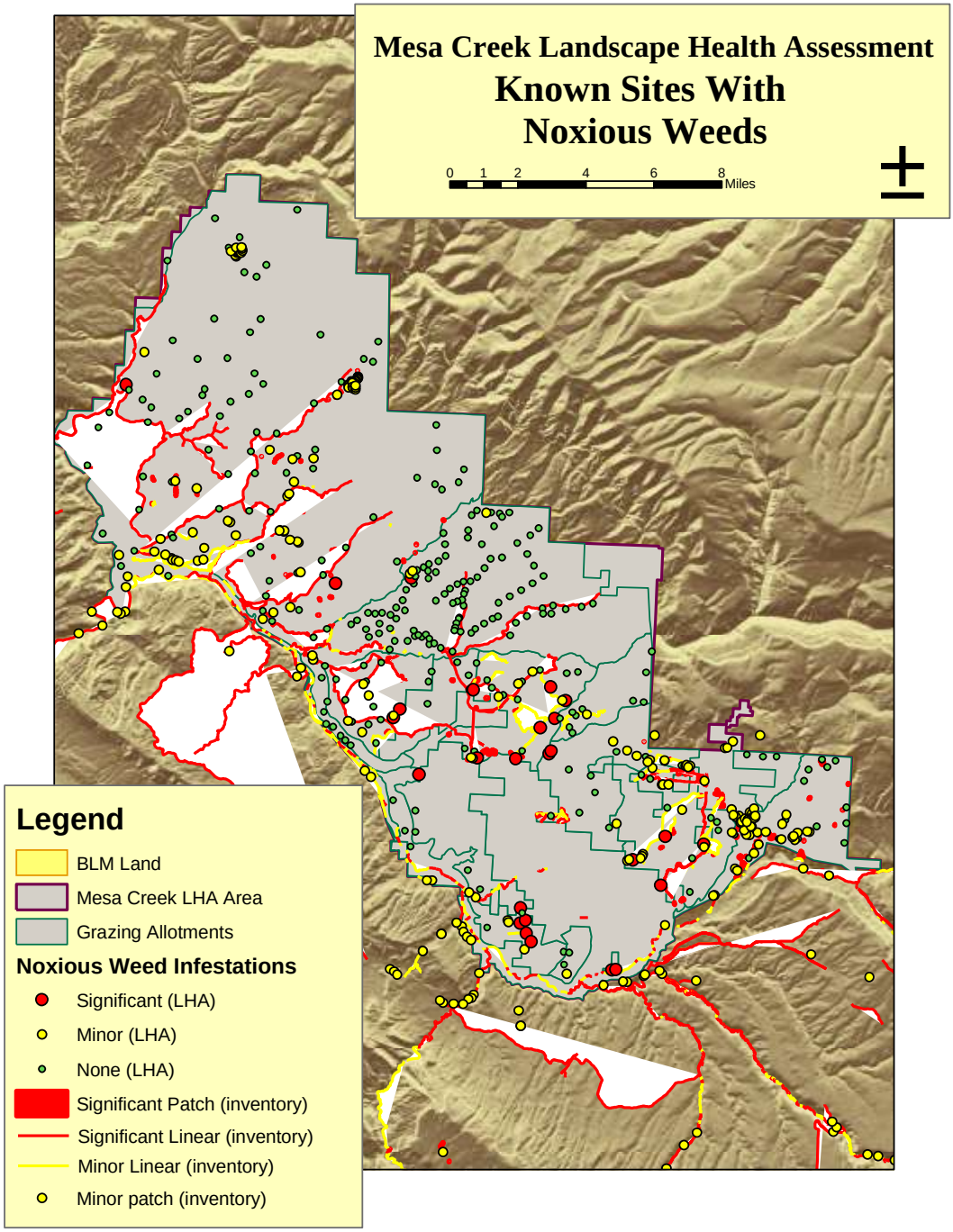


Figure 4.7 Mesa Creek LHA Area noxious weed occurrence.



Shrub Utilization

Hedging is the alteration of a shrub's growth form into a compact, dense growth of twigs. Hedging on shrubs is caused by repeated browsing by wildlife or livestock, and can result in reduced productivity and vigor of the shrub, or even death. Hedging is indicative of the balance between browsers and habitat carrying capacity. It is used here as one indicator of plant and animal community health. Problems with shrub hedging were found to be fairly few and isolated in the unit (Figure 4.8). Small areas having some problems with shrub hedging were found in the north west, northeast and south-central parts of the unit.

Shrub Vigor

Shrubs are an important component of most plant communities across the unit. They are often the dominant life form of the plant community and also provide structure, diversity and food, thus shaping many other aspects of the community. Shrub vigor, (or health and productivity) is used as an indicator of plant community health and wildlife habitat quality. Low vigor indicates the plants are stressed, more vulnerable to disease, unlikely to reproduce successfully, and produce less food for wildife. Problems with low shrub vigor were widespread across the unit (Figure 4.9). Shadscale was the shrub species to have the greatest problems with vigor in the unit. It was found to be in low vigor at 38 of the 67 sites where it was a significant part of the plant community. Five of 12 four-wing saltbush sites were in low vigor. Although sagebrush is limited in extent in the unit, plants were in low vigor at 3 of the 7 sites it occurred at. Large areas having shrub vigor problems were found in the western, and upper elevation central parts of the unit.

Standard 3 Landscape Scale Indicators

Healthy Wildlife Community

The wildlife community health assessment in the MCA, including habitat, was made using existing CDOW and BLM data, and qualitative knowledge, in addition to data collected during the rapid assessment process. The rapid assessment process by itself does not provide adequate information to fully assess this standard. A much more complex and time consuming effort would be necessary to collect sufficient information for an accurate assessments of health of the wildlife community. Information is not available, nor is it possible to obtain these data quickly enough to determine the status of many wildlife species and their habitats for this report. Additional information is needed for many of the wildlife species and their habitats; specifically small mammals, herptiles, birds, and predators.

Based on information available, the main problems or changes that relate to Standard 3 which are occurring in

the MCA at a landscape scale include: 1) major changes to habitat structure, condition, and arrangement of components across the landscape, 2) the long-term (15-20 year) mule deer population trend is down by 30%, 3) winter range quantity and quality is declining in most of the key winter concentration areas, 4) the long-term (15-20 year) elk population trend is up 100%, and appears to have a tendency to increase rapidly without constant heavy harvest pressure and, 5) several species of neo-tropical birds in the Western Colorado region are declining. The natural dynamics of this system appear to have been slowed down due to lack of natural disturbances, thus vegetation is getting older with less diversity. Also, the increase of human activities and development has caused changes to the dynamics of this area. Historic livestock grazing appear to have caused some effects to the vegetation communities causing cool season forbs and grasses to have declined, and pinyon and juniper to expand.

Specific problems or changes:

1. Wildlife habitat changes are occurring across the Landscape. Commutatively, the problems listed

Figure 4.8 Mesa Creek LHA Area shrub utilization and hedging. Sites with shrubs falling in hedge classes 3 or 6 depicted as seriously hedged, sites with shrubs in hedge class 2 or 5 are moderately hedged, and sites with shrubs in hedge class 1 or 4 are not hedged. Shrubs were not evaluated for hedge class across the entire LHA area.

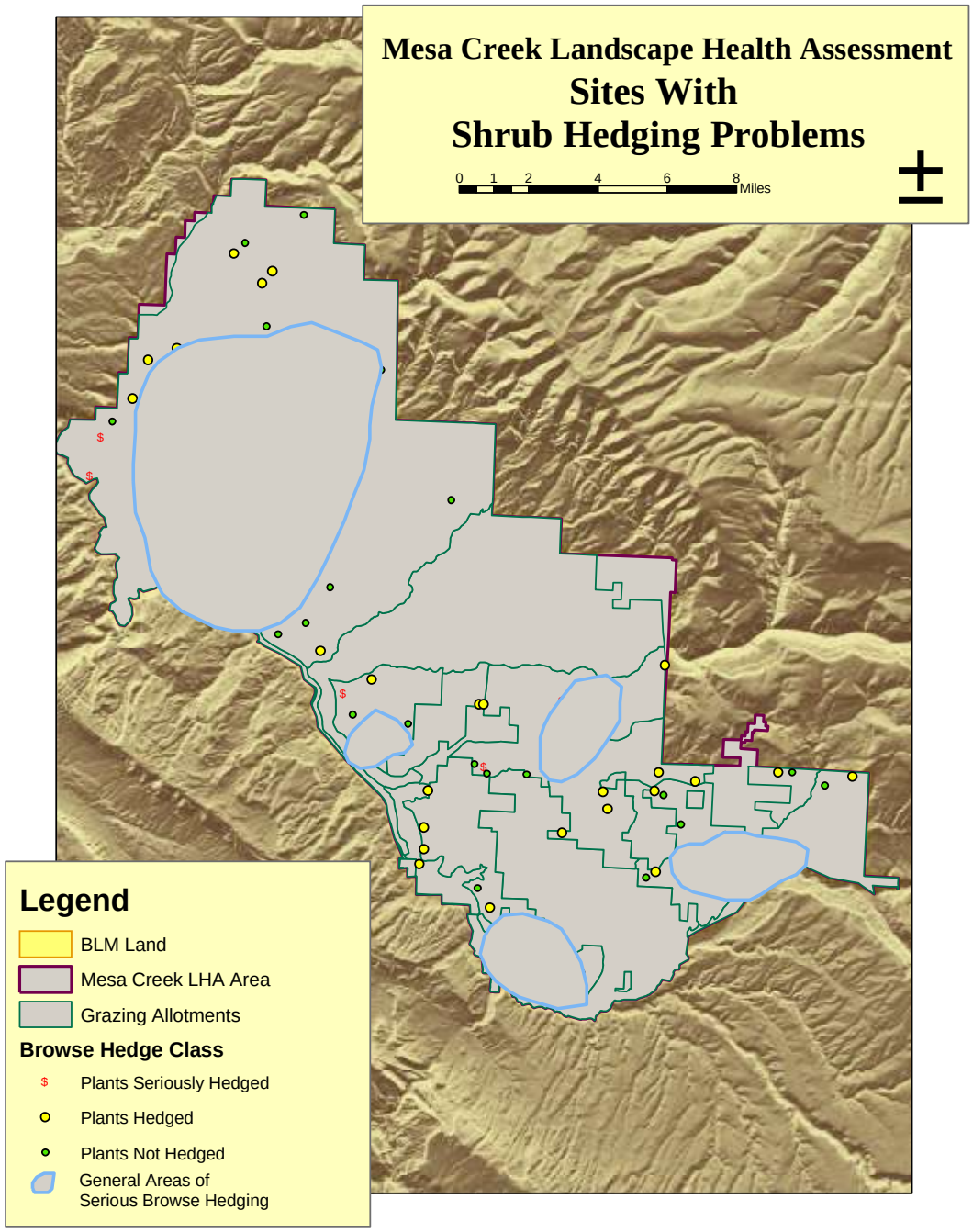
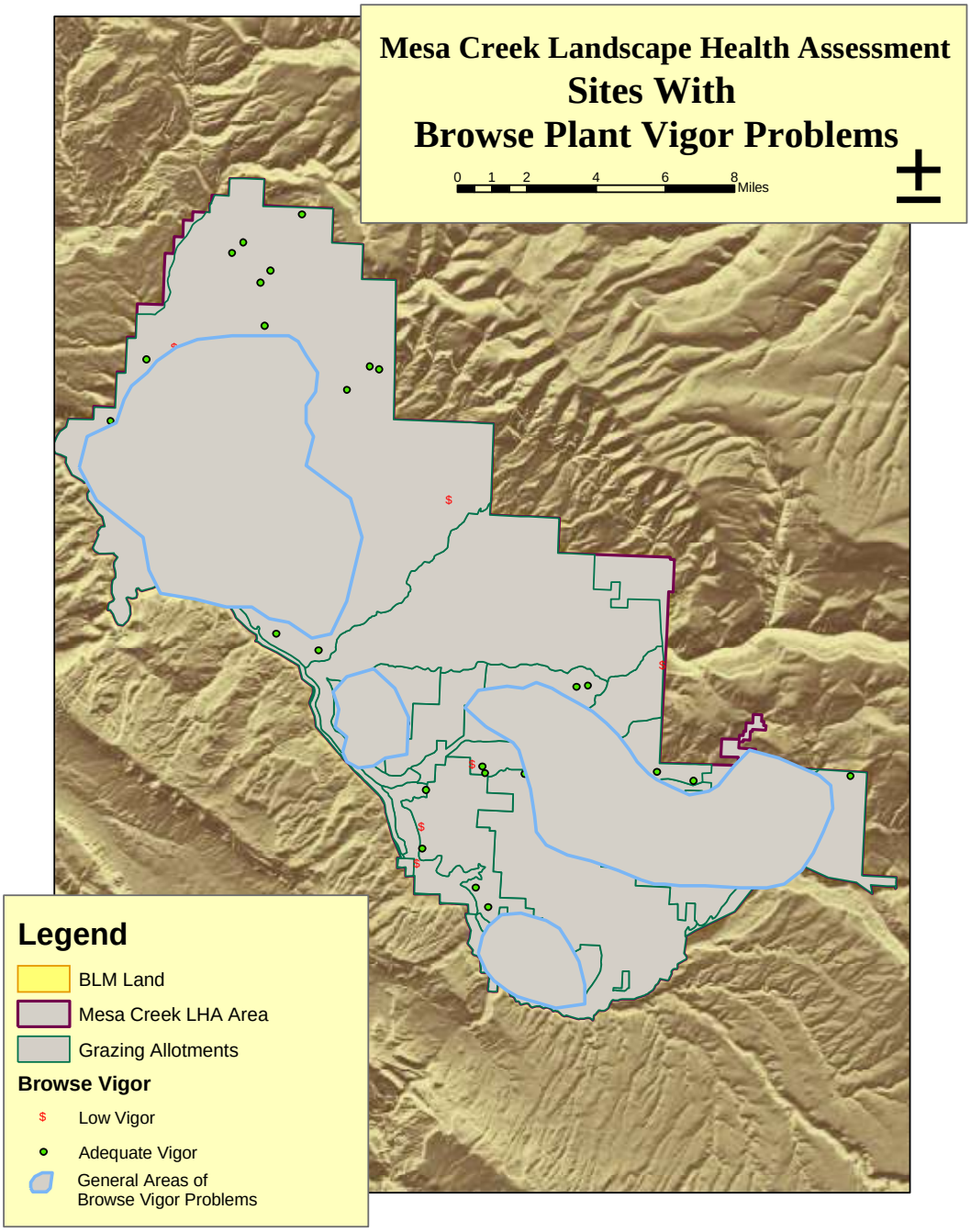


Figure 4.9 Mesa Creek LHA Area browse plant vigor. Sites with low shrub vigor have at least one major browse shrub species that is in predominantly low vigor across the site.



above in the Healthy Plant Community section are indicators of changes occurring to habitat structure, condition, and arrangement of components in the MCA, and across the larger landscape. As these habitat changes occur, so will the species that are present, their abundance and distribution, and perhaps their role in the community. As habitat abundance and quality declines for some species, it will improve for others.

Habitat changes that are occurring in the unit, and much of the adjacent landscape that affect the wildlife habitat quantity and quality are: vegetation seral stage is advancing, the average patch size is getting larger, the amount of "edge" is decreasing, the size and quality of browse stands are declining, human development is expanding causing fragmentation of key habitats for several species, and the abundance and amount of area supporting exotic and noxious vegetative species is increasing. In general, this area, as well as much of the adjacent landscape, is declining in overall quality for many species, and is becoming more favorable for species that require larger patch sizes of later seral stage vegetation, and with less diversity. This ecosystem is becoming more stable, with fewer disturbances occurring.

2. The mule deer population trend is declining in the MCA and the region (Uncompahgre Plateau, GMUs 61 & 62), which is consistent with declines in mule deer populations in adjacent areas and throughout the west. Although erratic annual fluctuations in mule deer numbers are typical, the 15-20 year trend is downward. The CDOW's desired mule deer population level for this area is 38,500. During the early 1980's the population was estimated at over 50,000, and the 2003 estimate was just over 34,000, the lowest in recent years (Figure 1.x).

Habitat changes due to fire suppression, historic grazing, development, and fragmentation; human impacts due to commercial activities and rapidly increasing recreational use; predation from coyotes, cougars and black bears; and competition from the increased elk populations are among the suspected and possible factors interacting to contribute to this decline.

In this unit mule deer depend heavily upon sagebrush for winter forage. For mule deer to utilize sagebrush without ill effects they need an abundance of herbaceous vegetation. Mule deer do not do well when their diets consist of >30-35% sagebrush. Our assessment data shows widespread low shrub vigor and utilization, and most of the shrubs are sagebrush. Also, assessment data shows widespread low presence of cool season grasses and perennial forbs, which helps to explain the lack of utilization on sagebrush, and perhaps is a factor in the decline of mule deer numbers.

3. Winter range quantity and quality is declining in the MCA, due mostly to: 1) the lack of disturbances scattered throughout the unit to reset succession, hence creating a more desirable mosaic of feeding and cover areas, and improving the herbaceous species composition and vigor of browse plants, 2) existing browse stands are advancing in seral stage, and in some areas browse plants are being replaced by pinyon and juniper mostly and, 3) over use by mule deer and elk, caused by their number being concentrated on the remaining amount of shrinking winter range, thus quickening the decline of winter range condition. See the Desired Landscape Objectives map for a comparison of existing mule deer winter range conditions to the desired landscape objectives for winter range.

The highest potential value of the MCA to mule deer and elk is winter range. There is abundant summer range at higher elevations of the surrounding areas. Presently, too much of the shrub area, especially the sagebrush stand, is too old and decadent, and without a good herbaceous under-story of cool season grasses and forbs. Also, not enough sites of early to mid seral stages, supporting sagebrush and/or mountain shrubs are interspersed throughout the area.

4. The elk population is increasing on the MCA, and is consistent with increasing elk populations throughout Colorado, and most of the west. Elk have a greater capacity to increase in this unit than they currently are, due to intentional heavy hunting pressure to control population growth. Unchecked, the elk population growth would likely have greater affects on the mule deer population status.

The CDOW's desired elk population level in this area is 8,500-9,000. From 1980 to 2000 elk numbers on the Uncompahgre Plateau increased steadily from 4,000 to 12,000. Then with heavy hunting pressure it was decreased to near 9,000 in 2003 (Figure W1). Habitat changes resulting in larger areas of more mature vegetation, especially on their summer range is believed to be a significant factor in this increase. Without continued high levels of harvest to this population, it would increase rapidly. This potential of the elk population to increase is a good indicator that the wildlife community is changing to meet the conditions created by changing vegetation.

5. Several Neo-Tropical Migrant Bird species show population trend declines, or have inadequate data for making trend determinations in the Western Colorado region. The Breeding Bird Survey provides the most complete and accurate data available for NTMB species throughout their range, and in the MCA.

Thirteen species (Table 4.1) show population trend declines in both the 26 and 10 year Breeding Bird Survey data sets. All of these species have high "importance of area" rankings, indicating a high proportion of their habitat in this region provides essential breeding habitat components. Five of these species, Vesper Sparrow, Swainson's Hawk, Say's Phoebe, Rock Wren, and Loggerhead Shrike have very low abundance ratings, therefore, indicating they are the species' of highest concern in this unit and landscape. The eight remaining species, Horned Lark, Common Nighthawk, Killdeer, Northern Flicker, Western Wood-Pewee, Chipping Sparrow, Sage Thrasher, and Brewer's Sparrow have moderate to good abundance ratings, thus, making them species of second highest concern. Species for which inadequate data are available (Table 4.2) to make status determinations with a high degree of certainty are considered priority #3 species. Many other NTMB species are present in this area, but their status appears to be good, and not of high concern at this time. The MCA is part of the larger overall landscape that provides habitat for all these species, which is important for their long-term sustainability. To benefit those species dependent on riparian communities, work should continue on noxious weed/tamarisk control.

Table 4.1: NTMB species showing declines during the 26 and 10 year BBS data sets in Western Colorado.

NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
Priority #1 species: PT26 & PT10 ranking = 4 or 5, AB ranking = 3-5, and IA ranking = 3- 5.					
Vesper Sparrow **	Annuals/Grassland	4	5	3	4
Swainson's Hawk *	Annuals/Grassland	4	4	3	3
Say's Phoebe **	Annuals/Grassland	4	4	3	5
Rock Wren **	Barren Land	4	5	3	3

Loggerhead Shrike *	Riparian	5	4	3	3
Priority # 2 Species: PT26 & PT10 ranking = 4 or 5, AB ranking = 1 or 2, and IA ranking = 3-5.					
Horned Lark **	Annuals/Grassland	5	5	1	5
NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
Common Nighthawk	Annuals/Grassland	4	5	2	5
Killdeer *	Annuals/Grassland	4	4	1	3
Northern Flicker *	Generalist	5	5	1	3
Western Wood-Pewee *	Generalist	4	4	2	3
Chipping Sparrow **	Ponderosa Pine-Doug Fir	5	5	1	4
Sage Thrasher **	Sagebrush	4	5	2	4
Brewer's Sparrow **	Sagebrush	4	4	2	5

Breeding Bird Survey rankings: 1= low concern, 5 = high concern.
* =Low, **=moderate, ***=highest potential for effects (+ or -) in Gunnsion Gorge area based on Breeding Bird Atlas information.

Table 4.2. NTMB species with inadequate data for making trend determinations (Priority #3 species.)

SPECIES	HABITAT	Abundance Ranking (AB)	Importance of Area Ranking (IA)	26 year Pop. Trend Ranking (PT26)	26 year Uncertainty Ranking (PTU26)	10 year Pop. Trend Ranking (PT10)	10 year Uncertainty Ranking (PTU10)
Northern Harrier *	Annuals & Grassland	4	3	3	4	3	4
Savannah Sparrow *	Annuals & Grassland	3	3	3	4	3	4
Common Poorwill *	Mountain Shrub	3	5	3	4	3	4
Gray Flycatcher ***	Pinyon-Juniper	3	4	3	4	3	4
Gray Vireo ***	Pinyon-Juniper	3	4	3	4	3	4
Long-eared Owl *	Riparian	3	3	3	5	3	5
Bank Swallow *	Riparian	3	3	3	4	3	5
Swainson's Thrush*	Swainson's Thrush*	3	3	3	4	3	4

Breeding Bird Survey rankings: 1= low concern, 5 = high concern.
* =Low, **=moderate, ***=highest potential for affects (+ or -) in North Delta area based on Breeding Bird Atlas information.

Native Plant Distribution

Ninety two different plant species were found to occur in the unit. This does not reflect all of the species seen, only those which occurred in significant amounts on at least one site. The very inconspicuous or sparsely scattered species are not reflected in this list. Utah juniper, a widely occurring native tree was the most widespread species, found as a significant part of the plant community on 80 out of a total of 197 sites where data was collected. The warm season galleta grass was the second most widespread species occurring in significant amounts on 72 sites, with basin big sagebrush the third most common on 57 sites. Needle and thread, a native cool season bunchgrass was the most common cool season grass occurring as a significant part of the plant community on 21 sites. The most common perennial forb was scarlet globemallow which was significant on 30 sites. Thirty three species occurred at substantial levels on only one site, and another 35 occurred on less than 10 sites.

As expected, both elevation and soils appear to drive where most of the plant species are located. The Morrison-derived shale soils on canyon side slopes support substantially different plant species than the sandy and loamy soils found on the mesa tops and along drainages. Deeper soils typically support some different species than shallow and rocky soils, although many species also occurred on both soil types. Elevation and aspect also affected plant distribution, with the more moist higher elevations and aspects typically supporting a greater variety and diversity of

species.

Colorado pinyon are being affected by drought and associated insect and pathogen problems across the LHA area. However, this is occurring in pockets, and living pinions are still distributed throughout the area. Big sagebrush were also in very low vigor across the unit, in part due to the drought. Recent observations indicate that many of these plants have recovered somewhat with increased moisture over the past winter.

At the level of data collection, it appeared that the major plant species appropriate to soil and elevation were found broadly scattered across their available habitat. This evidence indicates that major plant distribution problems are not occurring which would interfere with region-level population viability or resilience.

Connectivity

Not much information is available on assessing connectivity of habitat in dry woodland or semi-desert shrubland vegetation types, particularly in very rough terrain. A map of likely barriers and dispersal routes is included (Figure 4.10)

Possible Barriers and Dispersal Agents:

Impassible topographic features like rock walls, talus fields, and very steep slopes: Steep rocky areas are limited to the edge of Grand Mesa on National Forest lands just north of the unit. This rocky area probably cuts off direct access to the verdant mesa top from the drier landscape unit below. This rocky slope is probably an effective barrier to nearly all terrestrial species. It probably affects use of the unit by deer and elk in two ways: lower use of the western and central part of the unit than would be expected, and concentrated use and movement along the few passages up through the rock.

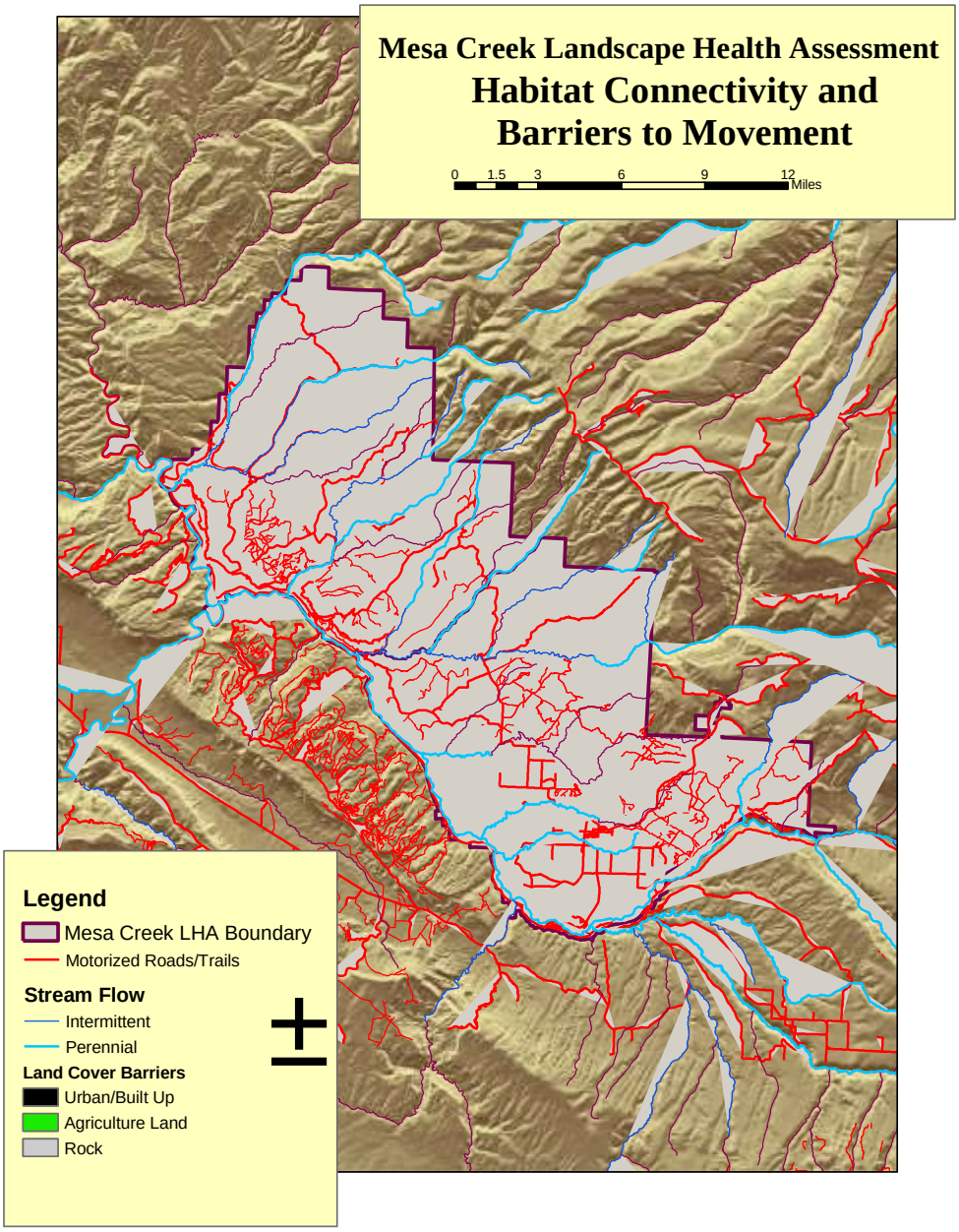
Expanses of barren land: The Mancos shale badlands have many areas that are nearly devoid of vegetation. These bare areas probably represent barriers to movement by animals that need hiding cover for movement, or those that are not able to travel long distances between food sources. These barren areas are widely scattered across the central part of the unit, and certainly impact the unit's usability for wintering mule deer and elk.

Rivers, streams, and dams: The Lower Gunnison River acts as a barrier to passage for animals unable to cross the 100' wide channels. The river forms the southern boundary of the unit, and probably restricts movement by some animals out of or into the unit from the south. The Hartland Diversion, just upstream of Delta, serves as a barrier to upstream movement of fish in the lower Gunnison River. The Redlands fish ladder, approximately 10 miles downstream of the western part of the unit has been effective in allowing movement of the endangered Colorado River

Fish upstream along the Gunnison River and into the unit. Streams and canals act as dispersal and movement corridors, for both plant and animal species. Weed species often move along streams because water transports their seeds, and because they find a similar habitat to irrigated cropland in the riparian zone.

Agriculture or intensive human land uses: Agriculture and residential use of land can act as a barrier to movement by species that don't use the nonnative vegetation, tolerate the presence of humans and domesticated animals like dogs, need hiding cover, or that cannot travel long distances in unsuitable habitat. The kit fox, a state endangered species, is a good example of a species that does not easily traverse subdivisions, agricultural fields, roads, and other human developments. Agriculture and residential development can also act as corridors for other species. For example, species that thrive in disturbed areas, those that are transported by domestic species, others that benefit from the irrigation systems and more abundant moisture, or those that use crop species are able to move through agricultural lands and populate the areas adjacent to agricultural lands. Such species as the European starling, the racoon, cats, burdock and Siberian elm are probably spreading and utilizing parts of the unit as a result of agricultural

Figure 4.10 North Delta Area landscape and habitat connectivity. Map shows potential barriers and corridors to plant and animal movement (roads, barren areas, rock, rivers or streams, and irrigated agriculture)



and human land uses adjacent to the unit. Irrigated agriculture is the dominant land use along the south-central and eastern parts of the unit, so the adjacent areas would be the most affected locations of the native plant and animal communities in the unit.

Roads and trails: Roads can be a barrier to movement because they are a strip of bare or altered ground, and because they are a focus of human activity and disturbance. In the case of heavily traveled roads, they can be a significant cause of mortality for animals trying to cross. The most significant road in the unit is Colorado Highway 50, which cuts through the central part of the unit, from northwest to southeast. It is being converted to a four-lane highway in 2002. Passage under the road is only possible in a few areas where the road passes over drainages. Some animals, such as pronghorn antelope may not use these passages because of their locations, distance between them, or aversion to going into tight, sight-constrained areas. The crossings are too far for other animals, such as prairie dogs to reach. Most roads in the unit are infrequently traveled, dirt roads. These probably do not act as a barrier in this ecosystem. Instead, they probably facilitate spread of some species, such as elk in the pinyon-juniper woodland, and weed species, which spread along the disturbed ground.

Livestock, people, vehicles, and pets: Livestock provide a mechanism for dispersal of seeds, insects, and disease. They are a principal source of weeds in native communities because they can transport seeds in their fur or digestive tracts, and because they typically move between heavily disturbed or agricultural private lands, up into native rangelands. They can also reduce the competitive capabilities of native plant species through grazing, and are a source of soil disturbance. To a lesser extent, people, their vehicles and their pets transport weed seeds in the same way. Livestock graze on nearly all the lands in the unit. All of these (sheep and cattle) spend some time on irrigated ground, or at home ranches during the year.

Vegetation Mosaic

Vegetation diversity in the North Delta Area arises from geology, soils and elevation diversity, as well as from disturbance (like fire) and the vegetation successional processes that follow. The successional processes are the vegetation stages that the plant community passes through following the disturbance. The arrangement of the variety of vegetation types across the area is also called the vegetation mosaic. The vegetation mosaic is a dynamic characteristic that changes over time. It is important chiefly in determining what types and amounts of wildlife and plant species can survive in an area. Some aspects of the mosaic are more fixed than others, for example, trees will not grow below a certain elevation. Others are more fluid, for example grass dominated vegetation can occur at nearly any location in the

area. Many of the vegetation types in the area can transition from one to another over time, or with disturbance.

It is commonly thought that disruptions in the amounts and types of disturbances in the landscape have changed the vegetation mosaic from what existed prior to European settlement. The general trend is suspected to be toward more mature vegetation. As a result, many vegetation treatment projects are being done to create earlier-seral vegetation. Objectives for how the vegetation mosaic should look have been developed for the Uncompahgre Field Office (Uncompaghre Field Office Fire Management Plan, 2000)

The assessment area is broken into 2 vegetation mosaic units: Well's Gulch for the western half, and Devil's Thumb for the eastern half (Figures 4.11 and 4.12). Each of these is further subdivided into polygons, each representing different landscape mosaic objectives. Table 4.3 below shows the desired proportions and patch sizes for each of the landscape units in the North Delta Area that have significant BLM acreage.

Figure 4.11 Mesa Creek LHA Area Fire Management Plan units for vegetation mosaic prescriptions.

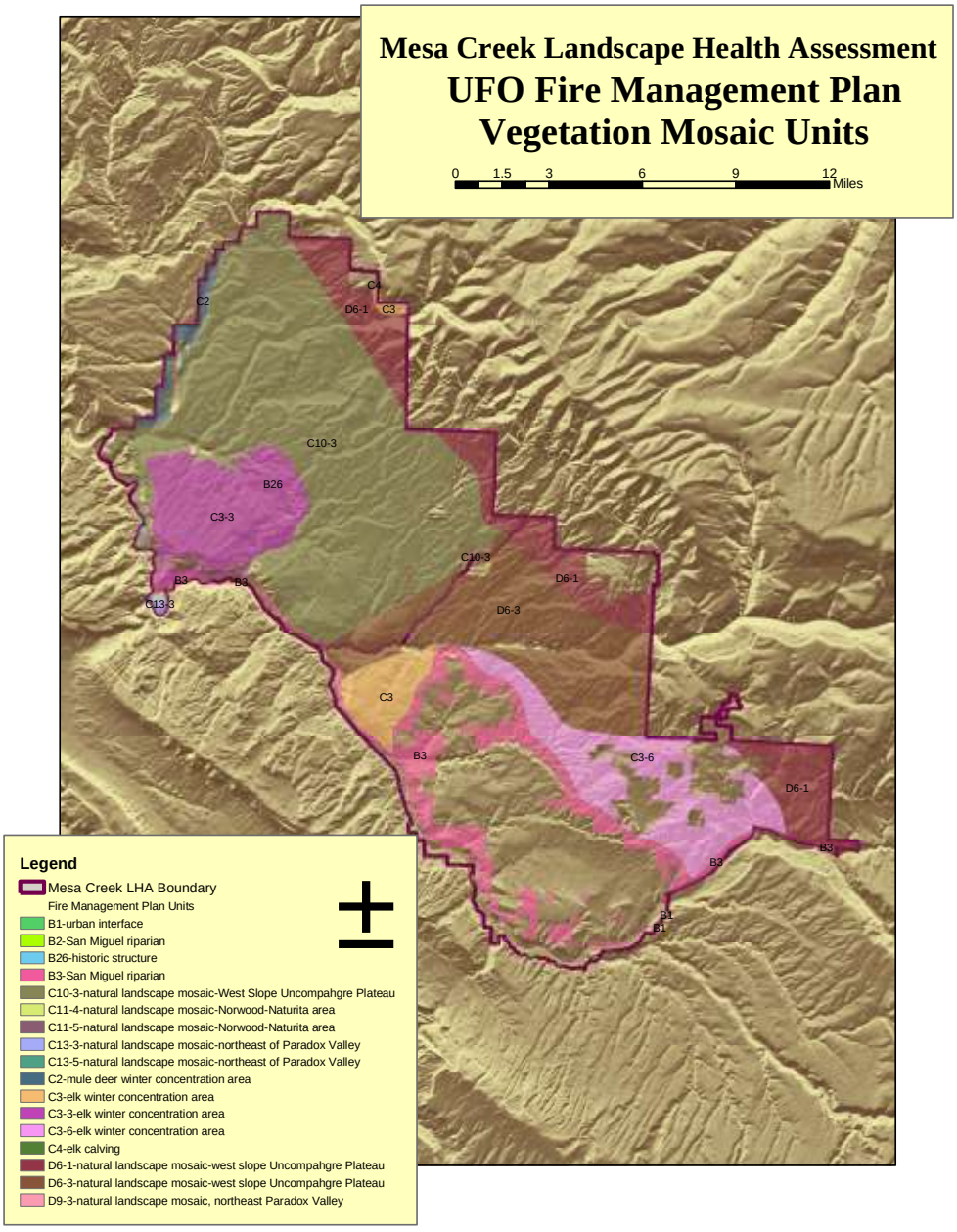


Figure 4.12 Mesa Creek LHA Area seral stages and vegetation mosaic prescription boundaries from UFO Fire Management Plan.

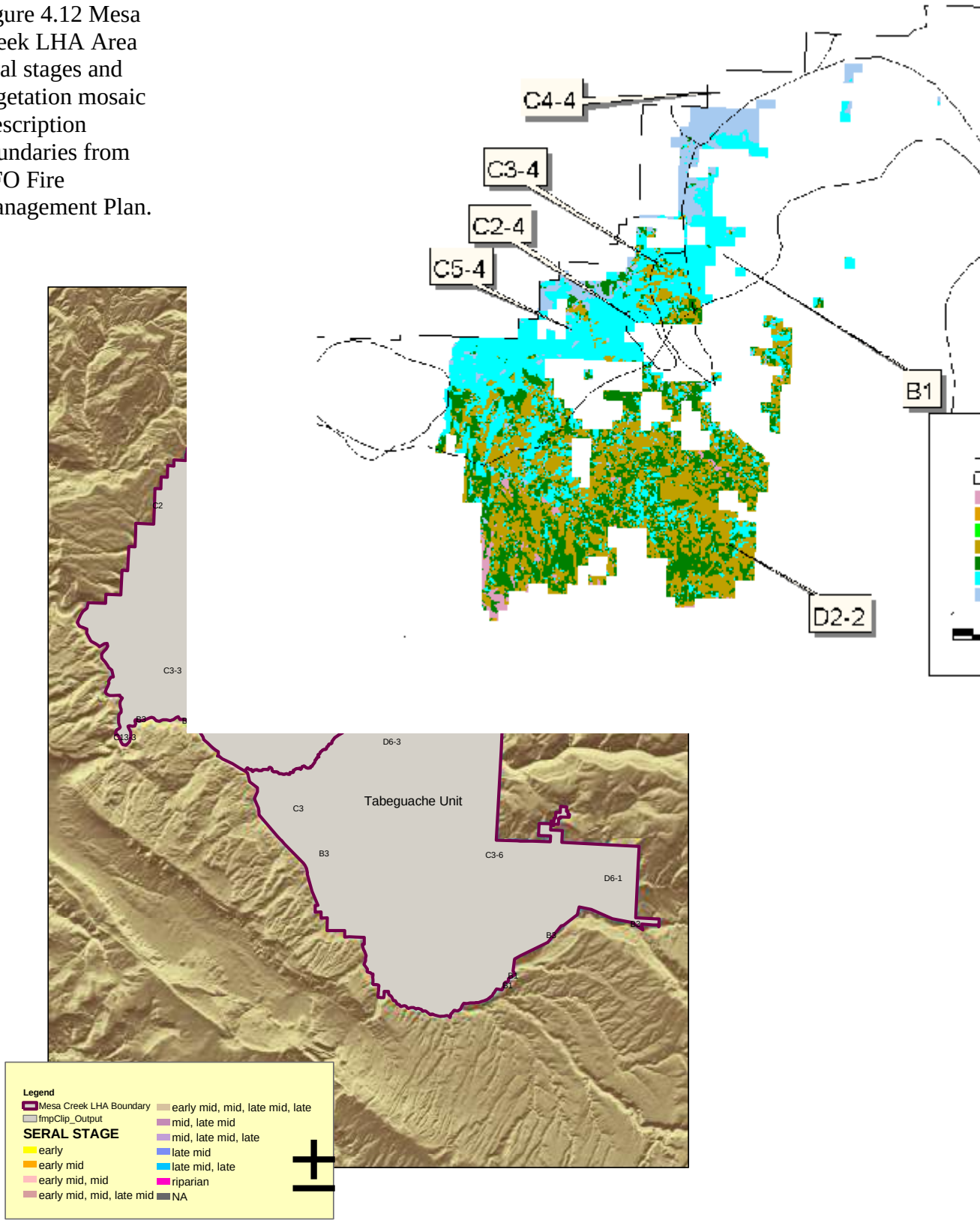


Table 4.3 Existing vegetation mosaic versus desired vegetation mosaic as outlined in the Uncompahgre Field Office Fire Management Plan (FMP) for the Mesa Creek Subunit

Vegetation Mosaic Unit **Total Acres in unit Other Polygons that have minor amounts of land in unit, and % of unit they comprise**	**UFO FMP polygon type**	**% of unit**	**% desired vegetation stage** e=early (herbaceous) em=early mid (shrub/grass) lm=late-mid (shrub-tree; tall shrub) l=late (tree) * designates matrix stages				**% estimated vegetation stage** e=early (herbaceous) em=early mid (shrub/grass) m=mid (shrub/young tree) lm=late-mid (shrub/mature tree; tall shrub) l=late (mature/old tree) top numbers are an accurate portrayal of estimated percentages along the seral stage spectrum, while bottom bolded numbers have been interpreted to fit into a single seral stage	
			e	**em**	**lm**	**l**	**e------em----m----lm------l**	**other**
Mesa Creek **Total Acres: 66,345 Others: B3=1%,; C6 2%; C2=2%**	**C3-elk winter concentration area**	16	30	10	20*	40*	11-----20-19------22,6-22- **11 39 0 28 22**	0
	Patch Sizes	Early seral patches range from >1-126 acres, and average 14 acres, while the prescription calls for most of the early seral to be in 51-200 acre patches. Early mid patches range from >1-707 acres, but most average around 13 acres, while the prescription calls for most of the early mid to be in 51-200 acre patches. Late mid patches are >1-343 acres, and average around 14 acres. Late patches are 0-450 acres, and average 7 acres in size. Together these two later seral stages form a matrix, as called for in the mosaic prescription.						

	C10-natural mosaic for west slope of Uncompahgre Plateau	68	30	30	20	20	7------10-10------19,4--49- **7 20 0 23 49**	1
	Patch Sizes	Early seral patches range from >1-1,039 acres, and average 13 acres, and early mid patches are >1-880 acres and average between 7-12 acres. Late mid and late form the matrix. Late mid patches range between >1-1,152 acres, averaging 14 acres, and late stage ranges from >1-14,579 acres, with an average patch size of 71 acres. The prescription calls for patches of all seral stages to be distributed 30% between 1-50acres, 50% between 51-200 acres, and 20% over 200 acres. Additionally, the prescription does not identify a matrix stage						
	D6-natural mosaic for west slope of Uncompahgre Plateau	13	30	30	20	20	13-----4--1-10-3-1-16-49- **13 5 14 16 49**	1
	Patch Sizes	Early seral patches range between >1-722 acres, averaging 25 acres, while early mid patches are >1-20 acres, with a mean between 2-4 acres. Late mid patches range from >1-309 acres averaging 9 acres in size, while late seral patches are >1-1,216 acres and average about 40 acres. The prescription for this unit calls for each seral stage to be made up of 30% small patches (0-50 acres), 50% in medium patches (51-200 acres), and 20% in large patches (>200 acres).						

Table 4.3 Existing vegetation mosaic versus desired vegetation mosaic as outlined in the Uncompahgre Field Office Fire Management Plan (FMP) for the Tabeguache Subunit

Vegetation Mosaic Unit **Total Acres in unit Other Polygons that have minor amounts of land in unit, and % of unit they comprise**	**UFO FMP polygon type**	**% of unit**	**% desired vegetation stage** e=early (herbaceous) em=early mid (shrub/grass) lm=late-mid (shrub-tree; tall shrub) l=late (tree) * designates matrix stages				**% estimated vegetation stage** e=early (herbaceous) em=early mid (shrub/grass) m=mid (shrub/young tree) lm=late-mid (shrub/mature tree; tall shrub) l=late (mature/old tree) top numbers are an accurate portrayal of estimated percentages along the seral stage spectrum, while bottom bolded numbers have been interpreted to fit into a single seral stage	
			e	**em**	**lm**	**l**	**e------em----m----lm------l**	**other**
Tabeguache **Total Acres: 47,820 Others: B2, B3 (San Miguel Riparian), C10, C11, C13, D9 (natural landscape mosaics) all less than 1%**	**B1-wildland-urban interface**	21	20	55*	15	10	33----17----------6---41-- **33 17 6 41**	1
	Patch Sizes	Early seral patches range from >1-852 acres, and average 23 acres, while the prescription calls for most of the early seral to be in 5-50 acre patches. Early mid patches range from >1-96 acres, but most average around 7 acres, while the prescription calls for the early mid stage to form the matrix. Late mid patches are >1-33 acres, and average around 5 acres. Late patches are 1-677 acres, and average 24 acres in size. In the prescription these two later seral stages should be distributed with 80% in small patches (<5 acres), and 20% between 5-50 acres.						
	C3-elk winter concentration area	30	30	10	20*	40*	19----14-1----------4---61-- **19 15 4 61**	0

	Patch Sizes	Early seral patches range from >1-1,693 acres, and average 31 acres, and early mid patches are >1-82 acres and average 8 acres. Late mid and late form the matrix, particularly on the east end of the unit. Late mid patches range between >1-34 acres, averaging 5 acres, and late stage ranges from >1-5,034 acres, with an average patch size of 79 acres. The prescription calls for 80% of patches of all seral stages to be between 51-200 acres, with the late mid and late stages forming the matrix.						
	D6-natural mosaic for west slope of Uncompahgre Plateau	48	30	30	20	20	7-----5-1-3—1----15—68- **7 6 4 15 68**	1
	Patch Sizes	Early seral patches range between >1-474 acres, averaging 12 acres, while early mid patches are >1-78 acres, with a mean OF 6 acres. Late mid patches range from >1-510 acres averaging 13 acres in size, while late seral patches are >1-10,838 acres and average about 100 acres. The prescription for this unit calls for each seral stage to be made up of 30% small patches (0-50 acres), 50% in medium patches (51-200 acres), and 20% in large patches (>200 acres).						

The great majority of the Well's Gulch unit is made up of the D2 polygon type, which is located in the valley bottoms and lower elevation saltdesert country. Most of it is not capable of producing trees or mountain shrubs, except in drainages. Most of the existing vegetation is in the early and early-mid stages, as specified in the D2 vegetation mosaic objective, although there is not enough mature shrub vegetation. Distribution of patch sizes looks appropriate, as well. The objective for this polygon is to have about half the patches less than 20 acres, half larger, resulting in a fine-grain mosaic.

Both the C3 and C5 polygons are on the upper slopes of the unit. Both have too high a percentage of the mature stage, relative to the C3 and C5 vegetation objectives. Both need increases in the early and late-mid stages as well. In the C3 polygon, existing patch sizes look appropriate, however the large expanse of pinyon-juniper woodland needs to be broken up more with more large patches of early stages. Patch size distribution in the C5 polygon looks in line with the objectives.

The Devil's Thumb unit is also mainly made up of the D2 polygon. As with the Well's Gulch unit, it has too much early and too little early-mid vegetation, although the patch size and distribution appears appropriate. The B1 polygon which represents urban interface, is very far from meeting the vegetation mosaic objective. It is almost entirely late-mid and late seral, while the vegetation mosaic objective calls for the majority to be in the earlier seral stages. To be effective at slowing the spread of wildfire, the mosaic should be much more fine-grained. The C5 polygon is fairly close to meeting the mosaic objective. It needs a little more of the early and early-mid stages, but in general the proportions are close to the objectives. Patch sizes are appropriate for the polygon.

Standard 4:

Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Indicators used to assess this standard include: stable and increasing populations of endemic and protected species, suitable habitat is available, minimal levels of undesirable or noxious plants, native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photosynthetic activity throughout growing season, community exhibits resilience to human activities, appropriate plant litter accumulations, and landscapes are composed of a variety of successional stages.

Acreage Figures

Meeting Standard 4		**Not Meeting Standard 4**	**Unknown**
Meeting	Meeting with problems		
74,583	0	0	0

See figure 5.1 for locations of problem polygons.

Specific Problems:

All areas were considered to meet Standard 4 for Threatened, Endangered, and Sensitive species.

Analysis of indicators:

The analysis of T&E, BLM sensitive species, and rare species has been conducted largely with existing information from the BLM files, CDOW data, or CNHP data, as well as the knowledge of the BLM staff, some of whom have been in this area for over twenty years. The rapid assessment process is not designed to provide the kind of data required for evaluating rare species. Where this analysis uncovers a significant data gap, recommendations will be made to help resolve it.

Stable or increasing populations of endemic and protected species: Most of the listed species which are known to occur in the analysis area occupy ranges that are much larger than the analysis area. For those like the bald eagle, and southwestern willow flycatcher the percentage of the population and its habitat that is represented by the analysis area is very small, which means that management of this specific area is not likely to have a detectable impact on range wide populations. In the case of the Uinta Basin hookless cactus and the endangered fish, changes to habitat within this LHA could have major impacts on the health of the species.

As is the case elsewhere within its range, the populations of wintering bald eagles in the area appear to have increased in the last ten years. Populations, and suitable habitat for the southwestern willow flycatcher have never been

documented on public land in this area (BLM, 2001), and there is not sufficient data to determine if this species was ever present in greater numbers. We do not believe that current management of public lands is having any negative impacts on the potential for this species to occur within the LHA area.

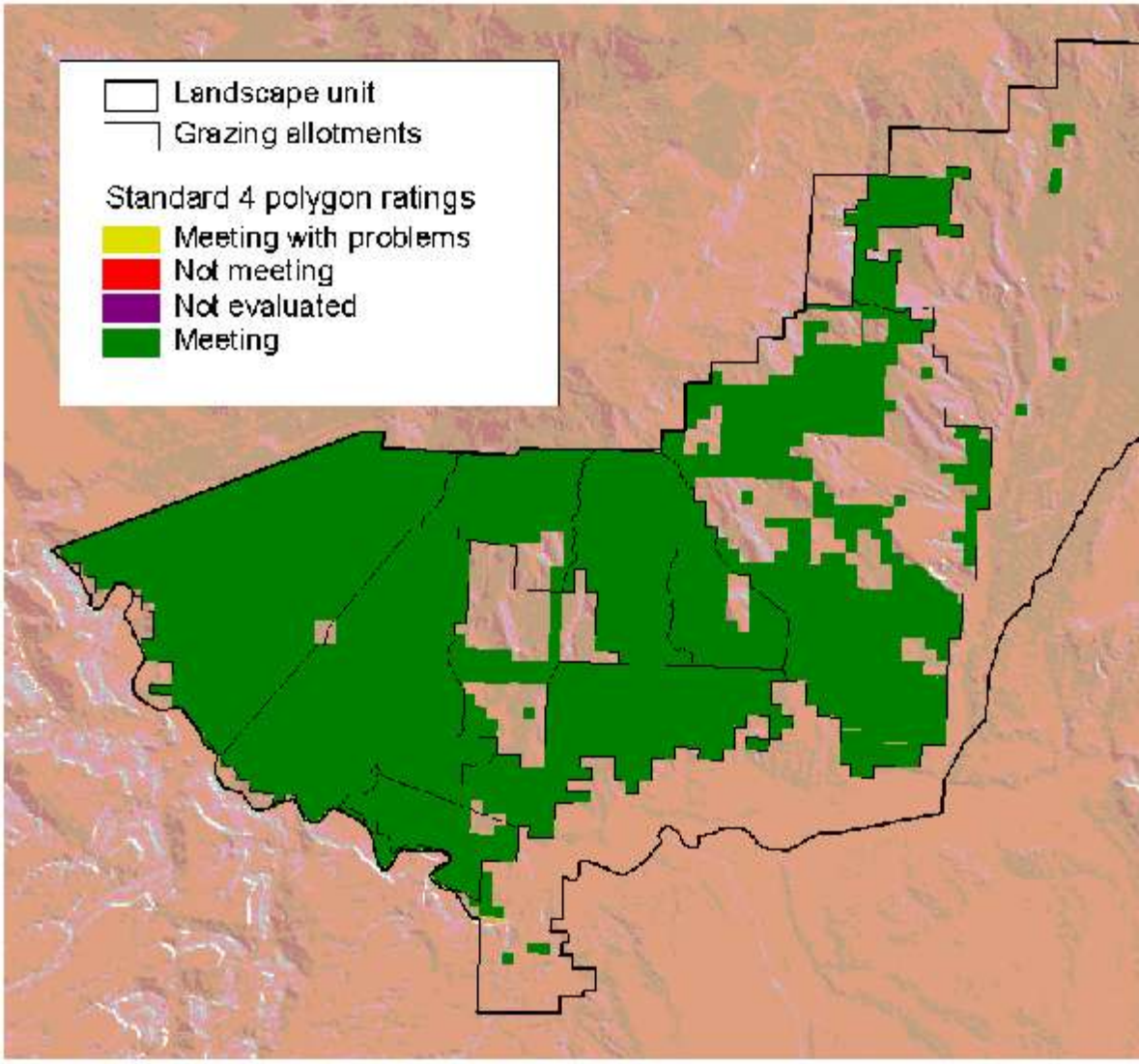


Figure 5.1 North Delta Area Standard 4 ratings.

Although there are a number of rare plants in surrounding areas that could potentially occur within this LHA unit, there are no populations of any BLM sensitive plants known at this time. This LHA unit is very important to the health of the Uinta Basin hookless cactus population in the Gunnison River area. Identified impacts to this species from activities on BLM lands are rare, and the population seems to be doing quite well. Exceptions are those instances where activities that are not specifically authorized by BLM or which are secondary to a permitted activity (sheep bed grounds) may impact local occurrences of this species. USFWS has indicated that the species has met the recovery goals in the recovery plan, and potentially could be delisted. The biggest potential threat to rare plants on public land in the analysis area is the continued expansion of off- highway vehicle use. BLM should work with CNHP to develop a suitable monitoring program to help determine the extent and rate of impact from this activity. BLM also needs to contract with CNHP to complete data collection on suitable habitats elsewhere within the analysis area.

Suitable habitat is available: All suitable habitats for wintering bald eagles appear to be used.
Ample suitable habitat is available for the southwestern willow flycatcher, but we do not know why these sites are not occupied by breeding pairs.

The Colorado pikeminnow and razorback sucker habitat on the lower Gunnison is not optimal for either species. The incision of the channel, stable flows (as a result of upstream dams) and lack of backwater areas and readily flooded floodplain areas all contribute to a reduction in habitat quality for these species. Much of the focus to date on improving the situation for these fish has been on changing the flows in the lower river by management of the flows from the Curecanti project. In addition, BLM should consider some project work to remove depositional levees from backwater areas, and improve the floodplain accessibility for the fish. The Uinta Basin hookless cactus is found reliably on most sites which offer a suitable substrate for them. There are vacant habitats available for this species.

Minimal levels of undesirable or noxious plants: Although noxious plants occur in the area, there is no evidence to indicate that they are causing problems for the rare plants and animals in the area. Cheatgrass has the potential to explode in some communities to the detriment of all the local native species, but within the analysis area this plant has not expanded to the point where it is likely to be problematic for rare plants and animals. The presence of tamarisk and Russian knapweed in riparian zones has no doubt reduced the habitat quality for southwestern willow flycatchers, but given the lack of flycatchers even in high quality habitats, it is doubtful that there is any effect from this on flycatcher distribution in the area.

Native plant and animal communities distributed adequately to assure sustainability: Based on habitat selection, and requirements, the listed, and sensitive, plant and animals in the assessment area are believed to be distributed

adequately to insure sustainability. The sole exception to this may be the kit fox, but sustainability issues relative to kit fox are outside the scope of BLM's management authority. Current data on the distribution and health of the area's prairie dog colonies is not available to help assess the trend or sustainability of habitat for those species dependent on prairie dogs, such as the burrowing owl. A renewed mapping/evaluation effort for the prairie dog colonies in the area should be pursued to help evaluate change in some areas and establish a baseline in others.

Flow management issues in the lower Gunnison River have contributed to a lack of replacement for the cottonwood galleries along the river. The age of the remaining trees and natural mortality will slowly result in reduced roosting site availability for wintering bald eagles. At this point, BLM management actions have little or no impact on the lack of cottonwood regeneration in the river corridor.

BLM's current management plans do not recognize the existence of the Potential Conservation Areas identified by CNHP to help sustain native plant and animal communities. Most of the resource values associated with the PCA's, except the plant communities, and CNHP watch species, are protected on a case by case basis by BLM. Since all of these proposed sites were identified after being managed for many years under current BLM management schemes, BLM believes that current management is compatible with continued maintenance of these sites.

Age class diversity to sustain recruitment and mortality fluctuations: There is no data available to determine if age class diversity is optimal for the species evaluated in this section. Population fluctuations for the Uinta Basin hookless cactus are much more rapid than originally expected, and in some cases significant recruitment events, such as the one in the early nineties near Escalante Creek, result in substantial increases in the number of individuals in the population. Cactus borers and other mortality factors seem to keep this species' populations in a constant state of change. At this time nothing indicates that there are survival or recruitment problems for any of the species considered under Standard #4, except perhaps kit fox. The kit fox genetic isolation from the larger western Colorado/eastern Utah population would require intervention from CDOW to resolve, perhaps by transplanting new individuals into this area from the larger population.

Photosynthetic activity throughout growing season: In most areas photosynthetic activity is present throughout the growing season. Exceptions to this would be the steep south facing slopes in the Mancos shale habitat areas, where high temperatures and lack of available moisture preclude the establishment and maintenance of plant cover. This is a natural situation in the adobes and endemic species have evolved to cope with this condition.

Community exhibits resilience to human activities: Data on this subject is limited, but BLM believes that the

Mancos shale communities naturally exhibit little resilience to disturbance. The soil chemistry and structure, low precipitation, and small amount of useable soil moisture result in communities that do not recover well from disturbance, and often become dominated by annual weeds, including noxious weeds. In some cases, especially in depositional valley bottom areas, after removal of perennial plants, the soil surface seals over in response to rainfall events and establishment of seedlings appears to be precluded. Additional factors hindering recovery, include soil compaction, and destruction of the cryptbiotic soil crust, which helps fix nitrogen, bind the soil particles together, and increase surface roughness. The general local perception of the adobes is that there is nothing living there, and its highest use is for a vehicle playground, utility location site, and dump site. These perceptions are likely to result in long term conflicts between the maintenance of healthy native plant and animal communities in the Mancos shale areas.

Appropriate plant litter accumulations: This indicator does not pertain to the species involved in this standard.

Landscapes are composed of a variety of successional stages: Within this analysis area the Mancos shale communities probably do not follow successional stages as commonly understood for most communities. Jayne Belknap, with the Biological Survey, (2000) indicated to Jim Ferguson that she feels that the successional pathways in these communities are very short, and may simply cycle from the endemic perennial species to annuals and back to the endemic perennials, which in some areas may be a monoculture of mat saltbrush. As a consequence, successional stages in these habitats may not be an appropriate measure of health. However there is still some concern that too much of the adobe landscape, especially in the valley bottom areas, is devoid of native perennial species. At the present time, there is no indication that this situation is causing any of the acres in the LHA to fail to meet Standard 4 for listed and sensitive species.

As reported under Standard 3 many of the other plant communities in the area are moving toward late seral stages in large patch sizes. Effects on the bald eagle, if any, would probably not be detectable above the normal range of variability of the systems on which eagles depend. The exception to this is the lack of replacement in the cottonwood galleries along the Gunnison River. In the long term, this will result in a loss of roosting sites along the river and reduction in its value for wintering bald eagles. Although this late seral situation may be having effects on other rare animals within the analysis area, there may be no practical way to collect sufficient information to determine how important that effect might be.

Standard 5: *The water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the state of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.*

Indicators used to assess this standard include: appropriate populations of macroinvertbrates, vertebrates, and algae, pollutants and sedimentation attributable to human activity is within amounts specified by the Water Quality Standards established by the State of Colorado.

Acreage Figures: Stream Miles Evaluated Against Standard 5

	Meeting Standard 5			
Stream Type	**Miles Meeting**	**Miles Meeting but Problem Areas**	**Miles Not Meeting**	**Unknown**
Perennial	20.6	30.0	0	0
Intermittent	28.1	14.4	0	0
Ephemeral	46.4	6.4	0	0
Total	95.1	50.8	0	0

Specific Problems

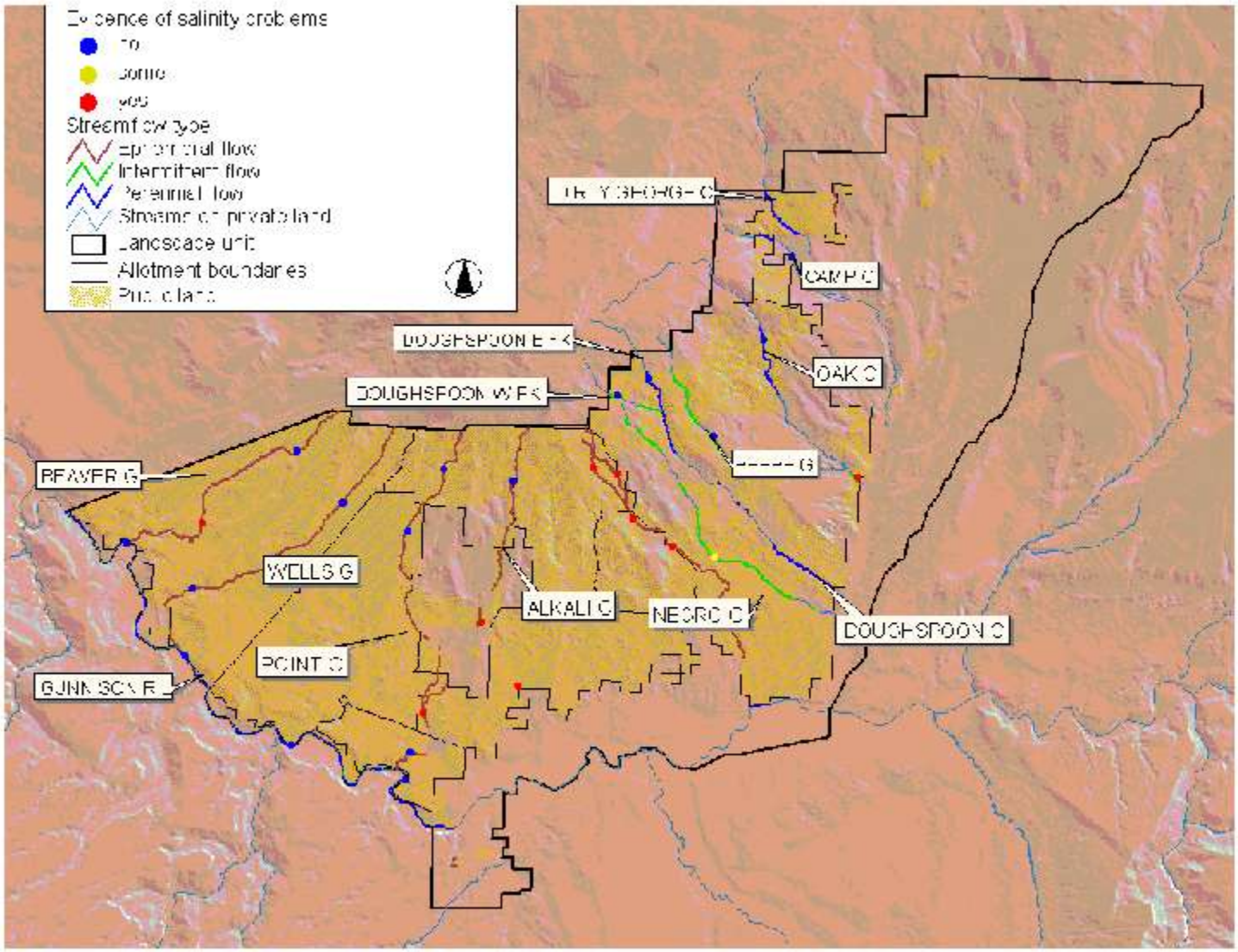
The potential non-point source water pollutants yielded from the landscape unit include,
sediment, nutrients, and biological pathogens (primarily bacteria and protozoan). Water quality analyses show that both nutrient loading and concentration of biological pathogens are at acceptable levels on the major drainages within the LHA area.

Measured suspended sediment concentrations were also relatively low compared to the regional average. However, suspended sediment measurements were conducted during low flow, and snowmelt-derived high flow conditions,

which miss the timing of the sediment contribution from the uplands on much of the LHA area. Much of the sediment derived from the LHA uplands is detached and transported during intense rainfall events in the late summer months. These rainfall events are usually short duration, typically lasting from less than 1, to no more than 3 hours. The resultant runoff in the areas streams is also short duration, making quantitative water quality assessments difficult. Thus, to assess a streams potential for suspended sediment loading in the LHA area, surrogate indicators (upland soil surface conditions) in place of water quality analyses are used. The specific surrogate indicators used for this assessment, include: both the amount of bare soil surface and live plant basal coverage, and degree of soil pedestal formation. Although other soil condition indicators were assessed during field evaluations, those mentioned above are the most appropriate for predicting soil erosion and sediment yield potential based on watershed condition of the uplands. Unstable channel conditions, such as active channel incisement (gullying) can also contribute to excessive sediment yield, but few of these conditions were observed in the LHA area.

Field visits during the year 2003 found several areas exhibiting poor upland watershed condition (high percentage of bare soil surface, low plant basal cover, and/or a high degree of soil pedestaling). The watersheds exhibiting soil surface conditions indicating upland watershed problems that potentially contribute to accelerated sediment yield include: areas within all of the major drainages across the entire LHA area exhibit low plant basal area; areas showing a high degree of soil pedestal formation were limited to uplands in Shavano and Campbell Creeks, and the upper reaches of Tabequache Creek; high occurrence of bare soil surface were observed on uplands in Shavano Creek, Campbell Creek, Lower Spring and Atkinson Creeks, South Fork Mesa Creek, Box Canyon, Calamity and Tuttle Draws, Big Bucktail Creek and unnamed tributaries downstream, along the San Miguel River. The named drainages mentioned above are rated as “Meeting With Problems” as these areas exhibited the most occurrences of soil surface problems within the LHA area.

CAUSATIVE FACTORS



Causative factors behind land health problems are addressed here for all standards taken together. The reason behind this is that one cause may impact several indicators and health standards at once. In addition, most of the land health problems observed in the landscape unit are not clearly linked to one causative factor, nor are they always related to a cause that is presently occurring. Often, causes were indirectly suggested, using the condition of indicators as evidence. In many areas, problems are occurring as a result of

several causative factors which overlap spatially. As a result, acreage figures reported below may overlap for various causes.

Historic Grazing: The removal of the Ute Indians in the early 1880s' opened the way for large unregulated livestock operations to graze the area. Ranchers had free and unlimited use of unreserved, unappropriated public lands until the Taylor grazing act of 1934. The primary purpose of this act was "to stop injury to the public grazing lands by preventing overgrazing and soil deterioration, to provide for their orderly use, improvement, and development, to stabilize the livestock industry dependent upon the public range, and for other purposes." Congressman Taylor was a Representative from Grand Junction and he represented the area covered by the assessment. It was no doubt that his first observations of the impact of unregulated livestock grazing on the livestock industry and the vegetation of the area that led to his sponsoring this legislation.

Regional accounts of settlement in this part of Colorado indicate that livestock numbers grazing the public rangelands were once many times what they are now (accounts vary widely ranging from 10-100 times the current number), and that the vegetation changed dramatically following the introduction of livestock. The assessment area was once a major stock driveway for domestic sheep moving from summer range near Lake City, Silverton, and Ouray to winter range west of Grand Junction and into eastern Utah. It was not until the passage of the Taylor Grazing Act that the current system of individual grazing allotments was established and implemented. The large mass migrations of sheep to and from the Utah winter ranges to the high elevation summer ranges began to decline as allotments were established and further declined as trucking became an alternative to moving sheep from winter range to lambing areas and to summer range by herding.

Prior to the Taylor Grazing Act areas close to towns typically had heavy winter, spring and fall use by livestock until the middle of the 20th century mostly by small 'farm flocks and herds". This was because these areas were lower elevation and the milder climate allowed wintering livestock to exist without supplemental feeding at all or very limited feeding.

The assessment area was part of a much larger areas that sheep ranged, most likely because of the type of forage and water availability. Montrose was for many years the largest shipping point for lambs to market in the United States. The Uncompahgre Plateau because of its abundant grass, plentiful water, and relatively low elevation was preferred as cattle range.

The interdisciplinary team identified 8,799 acres where historic grazing impacts had contributed to a polygon failing to meet a standard. An additional 42,522 acres were meeting with problems, and historic grazing was cited as contributing to the problems. The primary indicators used to infer this included landscape position and topography coupled with lack of cool season grasses in otherwise grassy communities, lack of forbs, or dominance by annual

plants.

Current Grazing: The main evidence used to conclude that current livestock grazing was causing problems with soil or vegetation were signs of heavy use (such as abundant cow pies, crowned grass plants, sheep concentration areas, terracing of slopes, or livestock paths) in poor condition areas, or heavy use on four-wing saltbush or other such palatable species. This was typically coupled with unduly long season and duration of use from the grazing permit. Timing of grazing and watershed condition were also used to infer if grazing might be contributing to problems with water quality. The influence of recent livestock grazing on water quality varies considerably with site specific conditions and is highly dependent on the frequency, magnitude and timing of runoff events in combination with when livestock are present. Additional factors that moderate this relationship are watershed condition, number and class of livestock, proximity of livestock to surface water systems, and duration of grazing. While these are not definitive indicators that current livestock grazing is the cause, they point toward a potential problem. Utilization information would be stronger evidence, however this has not been gathered very consistently nor uniformly across the area in the past. There were also some polygons where the team was not sure whether grazing was contributing to problems and identified the need to monitor impacts more closely. Combining these two together, there were 286 acres where the ID team identified current grazing practices as likely to be causing a polygon to fail to meet a standard. An additional 1,106 acres met standards with problems that were related to current grazing.

Roads: Poor road placement, road maintenance, weeds associated with a road, and the increase in travel on roads during wet periods were not identified as contributing to any areas failing to meet a standard, or to meet with problems. However, the fairly recent road inventory for the area showed about ½ of the road segments have instances of gullying, rutting or braiding along them. It can be concluded that while roads do not appear to be affecting soil erosion on the landscape scale, there are some significant site-specific soil losses occurring.

Fire Suppression: The absence of a natural fire regime caused by aggressive fire suppression policies of the past and lack of fine fuels necessary to carry burns contributed to 1,422 acres meeting standards with problems. There were no polygons that did not meet standards because of fire suppression. Dominance of large landscape areas by old age class woody species and residual low vigor shrub and grass species in pinyon-juniper woodland were considered to be evidence supporting lack of fire as a causative factor.

Noxious Weed Infestation: (this includes cheatgrass). Weed dominance, and the competitive nature of the weeds was considered to have caused 4,939 acres to fail to meet a standard, and another 456 acres to meet with problems. Another

5.8 stream miles failed to meet a standard an additional 5.8 miles met Standard 2 with problems because of weed infestations.

Heavy Browsing on Shrubs: Heavy browse utilization caused by grazing animals (wildlife and livestock) contributed to 567 acres meeting a standard with problems. During this assessment, no attempt was made to determine which type of animal caused the heavy use. Adjustments in grazing and rejuvenation of old shrub stands may help to ease this problem.

Recreation: Recreational activities including off-road driving and dispersed campsite creation contributed to 4,467 acres meeting a standard with problems. Recreational OHV use occurs most of the year in many of the adobe soil areas, especially in the eastern portion of the landscape unit. Hunting season is the main time of impact for the other areas.

Flow Regulation: The flow regulations imposed by the Aspenall Unit on the Gunnison River have changed the hydrograph along the Lower Gunnison River. Changes in flow may be responsible for much of the nonnative vegetation including saltcedar that occurs along these rivers, and has also contributed to the lack of cottonwood regeneration along the river. Flow regulations were cited as causing 5.8 miles of riparian area to meet Standard 2 with problems. Flow augmentation, which generally results from irrigation practices was suspected to contribute to 5.2 miles failing to meet a standard.

Transco Pipeline*:* This buried, natural gas pipeline traverses the central portion of the North Delta Area. It was constructed and revegetated in 1999. However, the revegetation appears to have failed along much of its length, and weeds – particularly halogeton dominates. The Transco pipeline contributed to 4,792 acres not meeting a standard.

Land Development*:* The development and subsequent irrigation of land underlain with Mancos shale are resulting in deep groundwater percolation and leaching of very high salinity and Selenium concentrations. Commonly, the groundwater associated with land development discharges to the surface off site. In the case of the Devil's Thumb Golf, impacts are occurring on private, county and federally managed lands.

RECOMMENDATIONS

Standard 1 Soils:
In areas with elevated bare soil levels, leave more plant litter on the soil surface. Limit grazing utilization during the dormant season to 50% use on palatable species.

In areas with low plant basal cover, minimize grazing impacts to plants during periods when the grasses are actively growing. Prevent grazing on regrowth by limiting time of use to 2 weeks or less in a given pasture or grazing area. Minimize instances where livestock graze the same areas in both spring and fall seasons. Provide for occasional, year-long rest.

Finalize the North Delta Area road map. Identify the eroding road segments for the North Delta LHA area. Combine this map with a map of high erosion risk areas to identify and prioritize areas for road maintenance and management. This action should adequately address the recreational impacts observed.

Use the range project inventory information in combination with the map of high erosion risk areas to identify projects contributing to increased erosion. Identify and implement corrective measures for project maintenance, management, or deconstruction.

We need to continue to monitor the rehab effort on the Transco Pipeline, and ensure that follow-up rehab is carried out where needed. In many areas, perennial vegetation has not been adequately established, and the soil is vulnerable to erosion.

We need to re-introduce fire, (or simulate its effects) in the pinyon and juniper upland sites as well as those areas immediately below the pinyon sites. These sites are losing herbaceous vegetation cover, with associated reductions in plant basal cover and long term loss of site stability and maintenance of the soil resource.

In seriously degraded depositional areas in the Mancos shales, implement vegetation restoration activities. Use restoration strategies developed in the Gunnison Gorge NCA Mancos areas.

Standard 2 Riparian:
Continue negotiations with the Park Service on the Upper Gunnison flow and water right. High flows during some

years at the time of spring runoff should improve habitat for native riparian vegetation, and reduce some of the tamarisk and knapweed.

Continue to work on the control of tamarisk and knapweed throughout the LHA area, using the weed inventory map to target areas for treatment.

Prevent additional damage to existing native riparian species by limiting grazing use on willows to 30% where grazing is found to exceed that level. Reducing stress on willows should make them more competitive with tamarisk.
Revisit Negro Creek and Oak Creek to determine why they are not functional.

Standard 3 Healthy Native Communities:

Improve perennial grass, cool season grass and forb cover by adjusting livestock grazing where it is a contributing factor. During the growing season, prevent grazing on regrowth through limiting time of use to 2 weeks or less in a given pasture or grazing area. Minimize instances where livestock graze the same areas in both spring and fall seasons. Provide for occasional, year-long rest.

Improve perennial grass, cool season grass and forb cover, shrub vigor and vegetation mosaic by reintroducing fire, or simulating its effect in the pinyon-juniper zone as well as those areas immediately below this zone. The overall zone is losing vegetative and habitat diversity as plant successional stages mature in the absence of fire. Efforts should focus on the C3 and C5 Fire Management Plan polygons, and be planned to meet the objectives for these polygons. Reseed fires and similar disturbances with native, adapted species where threat of weed invasion is likely, or native community is depleted.

Continue to work on the control of tamarisk and other noxious weeds throughout the LHA area using the weed inventory map to target areas for treatment.

Finalize the North Delta Area road map. Use this to identify unnecessary roads for grazing management and recreational access such as hunting, in order to reduce the spread and abundance of halogeton and cheatgrass in Mancos shale soils and those areas affected by saline soils.

Continue to monitor the re-seeding effort on the Transco Pipeline, and ensure that follow-up revegetation is carried out where needed. Currently, it is a continual source of halogeton seed for the area. All uses in the area should be analyzed for their impact on the success of the seeding, and accordingly managed.

Develop a vegetation re-seeding strategy for future surface disturbing activities that would be utilized in future ROW grants. Base this strategy on restoration research plots in the Gunnison Gorge NCA.

In seriously degraded depositional areas in the Mancos shales, implement vegetation restoration activities. Use restoration strategies developed in the Gunnison Gorge NCA Mancos areas.

Investigate shadscale vigor issue. Determine if it is a natural phenomenon which the plant community can accommodate and recover from. If necessary, recommend management actions.

Work with DOW and CDOT to monitor impacts of highway widening and development of private land on pronghorn population. Mitigate impacts where possible via ROW stipulations or habitat improvement.

Standard 4 Special Status Species:
Work with DOW to improve information on status of prairie dog, burrowing owl, and kit fox in the area. If necessary, recommend management actions to improve habitat for these species.

Continue to work with the Bureau of Reclamation, Colorado Division of Wildlife, and U.S. Fish and Wildlife Service to enhance habitat conditions for the listed fish, and replacement of cottonwood galleries on the lower Gunnison River.

Consider amending the Uncompahgre Basin Resource Management Plan to include special designations for the CNHP Potential Conservation Areas.

In order to preclude impacts to Uinta Basin hookless cactus, identify those areas where sheep camps/bed grounds should not be established, and impart that information to the livestock permittees who graze in the cactus habitat areas.

Standard 5 Water Quality:

Assess the condition of all in-channel structures for possible contribution of sediment to local drainages, and repair/reclaim as necessary.

Implement management strategies to maintain or increase basal vegetation cover across the LHA area, and decrease amount of bare soil surface on the uplands in the watersheds rated as “Meeting with Problems”.

Incorporate the results and make additional water quality recommendations if needed, based on macro-invertebrate samples collected on the major streams in the LHA. Samples were collected during the 2003 and 2004 filed seasons, but results are pending.

Perform road maintenance on roads identified with drainage or erosion problems.

Access identified incised channel systems as to their stage of development and causal factors, and implement corrective actions, if appropriate.

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